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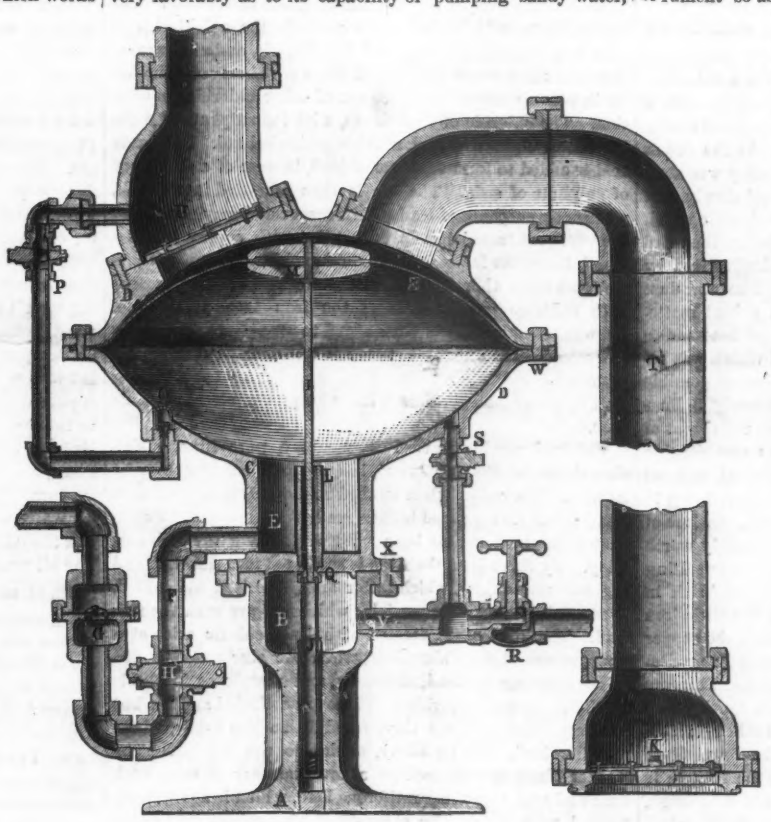
Cheap and Simple Anti-Friction Steam-Pump.

IF the problem were given to mechanical engineers to construct a low-pressure condensing steam-pump, likewise adapted to the purposes of a blast-engine, in which there should be no piston, no piston-rod, no bored cylinder, or rather no cylinder at all, no condenser or air-pump, no friction or packing of piston and piston-rod, and consequently no need of lubricating, the majority would pronounce it an insolvable puzzle. However, it has been solved by Mr. Thomas Shaw, and is represented by the accompanying engraving.

He proposes, in place of a cylinder, two globular sections, or flattened hemispheres, C and D, with a flexible diaphragm N between, which performs the function of the piston. This diaphragm is made of rubber-coated duck, and so large that it can float against the upper and lower walls of the hemispheres C and D, between which it is clasped at its circumference, and secured by bolts and nuts. There are two metal discs, M in its centre attached to a valve-stem I, which works the valve J below, situated in the base A, and which valve alternately opens the communication between the steam-chest B and the space below the diaphragm. Steam is admitted by the cock R, through the tube V to the steam-chest B. When starting the pump, some steam is blown through the cock S, to clear the space below the diaphragm of air; then this cock is closed, and steam admitted only from the steam-chest B by Q, the seat of the valve J, which is closed by the rod I, when it has reached its highest position. When by means of the condensation of this steam under the diaphragm, this is moved downward, the water will then ascend through the tube T, and fill the space above the diaphragm, to be driven thereafter upward through the tube U. As soon as the steam is readmitted below, the diaphragm is again driven upward. The height to which water may thus be driven upward is of course about 32 feet for every atmosphere, or every 15-pounds pressure of the steam. As the atmospheric pressure raises the water through the tube T, its vertical height must be less than 32 feet. The condensation of the steam takes place by means of cold water injected from U, by means of the connecting tube P; the valve O, opening automatically as soon as the pressure of the steam relaxes by the shutting of the admission-valve at Q; and this valve closes again as soon as the steam is admitted above it, by the opening of the valve J at Q. The condensed steam and condensation water are collected in the hot well E; from thence they escape through the tube F and valve G.



ANTI-FRICTION STEAM PUMP.

One of the beauties of the arrangement of this pump is that all the valves are kept in their place by the pressure of steam or of water, till their position is changed either by a change in the pressure or by an automatic adjustment.

To recapitulate the action of this pump when in full operation, we will follow first the course of the steam. It enters at R, through V, into the steam-chest B, passes through the open port Q, through the tube L, under the diaphragm N, lifts this upward till the rod, or valve-stem I, by means of a button at its lower end, lifts the valve J into its seat Q, where it will be held by the pressure of the steam from below. Now, in consequence of the want of supply of steam under the diaphragm, a slight condensation will immediately take place, which will relieve the valve O, and cause the injection of cold water, which will then at once condense all the steam, collecting it in the hot well E. This condensation will of course cause the diaphragm to descend. Upon reaching the bottom, the stem T will again reöpen the valve J by pushing it from its seat in Q; then the steam will reënter, and the same motions will be repeated. We ought to remark also that the condensation water and condensed steam are periodically discharged at every upward stroke of the diaphragm, by the pressure of the steam lifting the valve from its seat. The amount thus discharged has to be regulated by the cock H, closing it so that no steam (hot water only) escapes by this pipe. The admission of condensation water must also be regulated by means of the cock P, according to experience.

We scarcely need follow the course of the water pumped upward, as it is similar to that of every force and suction pump. When the diaphragm moves downward it ascends through the valve A, and will fill the space above the diaphragm. As soon as the diaphragm ascends, the valve A closes, and it is driven upward through U, which tube is also provided with a valve opening upward, thereby preventing the water from descending when the diaphragm descends.

The interior of the lower hemisphere is coated with a non-conducting material, to prevent a premature condensation of steam during the upward motion of the diaphragm, which floats up and down without strain, the pressure being equal on both sides; it serves in fact only to prevent the contact of steam and water, and consequently loss of heat by useless condensation of the steam at the surface of the water. It is in reality not the diaphragm which drives the water upward, but the steam pressure, the diaphragm serving as an almost neutral body between the two. The reports of those who had such a pump in use for eight months without wear, speak very favorably as to its capability of pumping sandy water, which would injure friction-pumps, and also as regards its cheapness, compared with other pumps of the same capacity.

By attaching a separate water-tank to the tube P, containing a supply of condensation water, the pump may be converted into a blower. The tube T may be very short, or entirely omitted, retaining only the valve K. The tube V will serve for the blast, which may be changed easily from an intermittent to a continuous operation by attaching any kind of air-reservoir. These pumps are manufactured by P. S. Justice, 14 North Fifth-street, Philadelphia.

Remarkable Railroad Feat.

THE Missouri Pacific Railroad Company recently performed a feat which is entitled to rank among the extraordinary ones in the history of railroads. This was no less than the changing of their entire track from St. Louis to Leavenworth—a distance of 318 miles—to the narrow gauge in sixteen hours. The track was formerly 5 feet 6 inches in width, and it became desirable to alter to 4 feet 8½ inches, so that it would conform with the tracks of other railroads, a number of which connect at Kansas City. Extensive preparations were made for the change; new engines and cars were purchased and many cars altered. Every thing was finally got in readiness, and it was decided to commence the herculean task of altering the width of the track on Sunday morning. Two hundred and seventy-eight men were engaged in addition to the large force in the employ of the company, and the whole were detailed to do the work on different sections of the road at the same time. The work commenced at the Leavenworth end at 4 o'clock yesterday morning, and from St. Louis at 10 o'clock. The men, under the direction of Colonel H. C. Moore, the general superintendent and chief engineer of the road, and M. J. L. Hinckley, the assistant superintendent, labored most strenuously, and the work went on very rapidly. By 8 o'clock in the evening all of it was completed. The result was most gratifying. The change was made without the losing of a single train. Colonel Moore left by a special engine to go over the road and see that every thing had been done satisfactorily.

Balances of Great Precision.

IT appears that the celebrated physical instrument-makers, Collot, Frères, of Paris, have greatly improved the mode of making balances, by devising what is called a balance on two columns. Without reproducing the woodcut contained in the above-named periodical, it is not easy to describe this instrument so as to be clearly understood by our readers. The system is an entirely new one, and by its application only is it possible to place the point of support on the axis of the balance, and thereby to shorten the length of the arms which bear the weight. Among the particulars mentioned of balances made according to this new system, we quote a balance made to bear, in each pan, 35 kilos., and sensitive with that load for 5 milligrms., and possessing, at the same time, perfect stability. Several balances of this kind have been made for the Russian Government; and the University of Upsala, Sweden, has two balances, each to carry 1 kilo. in each pan, and sensitive for 1½ milligrm. The laboratory of the School of Mines, Paris, has received, from MM. Collot, a balance of precision which, the author says, excels any thing hitherto made. Balances with aluminium beams have also been introduced by these makers.—*Chemical News.*

Man-Hoist for Mines.

AN English exchange gives the following nice bit of calculation upon the question of miners travelling to and from their work as compared to the use of machinery for their transportation:

Let us suppose 600 men are employed, and have to descend 1200 feet to their work, and that each man weighs 120 pounds. Each man will have, of course, to lift his own weight, and, therefore, the whole will lift—$600 \times 120 \times 1200 = 86{,}000{,}000$ pounds. To raise one million of pounds a foot is a good day's work for a man, so that there is lost the work of 86 men. Taking each man's labor as worth 6*s.* a day, that gives a total of £12 18*s.* loss in money value per diem, or for 300 working days in the year, £3870 per annum is lost. This is a sum large enough to put up a steam-engine and raise and lower the men by machinery.

Wealth of the Metropolis.

THE total value of the real and personal property in the city and county of New-York for the year 1869, according to a recent official statement, is $964,100,597, against $908,436,327 in 1868, being an increase of $55,664,270. The separate items are as follows in 1869: Real estate, $684,140,768, and personal estate, $279,959,829; in 1868, real estate, $623,236,555; personal estate, $285,199,772, so that the real estate has increased $60,904,213, and the personal estate has decreased $5,239,943.

A New Fish.

A WONDERFUL discovery has been made in Algeria. An artesian well lately sunk at Ain Sala to the depth of forty-four meters threw up not only a large body of water, but an innumerable quantity of small fish, which are described as being, on an average, half an inch in length, and resembling whitebait both in appearance and taste. From the fact of the sand extracted from these wells being identical with that which forms the head of the Nile, it is conjectured that an underground communication must exist between them and that river.

Desilverization of Lead by Means of Zinc.

BY H. B. CORNWALL, ENGINEER.

IN this final article, the methods of obtaining the silver and lead from the rich zinc crust will be given, and also the means employed to make profitable use of the zinc. Both the wet and the dry way have been employed, and the best means of exhibiting the theory and working of the various processes will be to give descriptions of them as pursued at different works. Distillation in retorts was originally proposed during the early stages of Parke's process, and was tried by Karsten and others, as described in our first article; but it offered many difficulties, and was not readopted by the Prussian experimenters. The zinc crust was successfully treated in the Rhenish works by smelting it in a low furnace, after first liquating it. The alloy is placed in a kettle furnished with a pipe, which leads into a kettle below. The upper kettle is then strongly heated, when the lead begins to *sweat* out, carrying with it a little silver and zinc, while the greater part of the rich zinc alloy floats on the surface of the metallic bath as a pulverulent mass. When no more lead separates, it is drawn off through the pipe into the lower kettle, leaving the rich zinc crust behind. In order to obtain the silver remaining in the liquation lead, it is allowed to cool slowly, when the zinc separates, just as in the first steps of the process, forming a rich crust, which is removed and subjected again to liquation. The lead remaining in the kettle is quite poor, and is added to the work-lead of a subsequent operation before the third portion of zinc is put in.

The rich residue from the liquation consists partly of pulverulent oxides of lead and zinc, and partly of metallic alloys. Illing gives the following table, showing the relative amount of zinc residues obtained from lead treated at the Rhenish works:

From lead with	0.025 %	silver,	2 %
" "	0.100 %	"	4 %
" "	0.300 %	"	6 %
" "	0.500 %	"	7 %
" "	0.800 %	"	9 %

This residue is passed through a low shaft-furnace, with coke and puddling-slags, and the zinc is partly slagged off and partly volatilized. The resulting product is a rich lead, which is cupelled on an English cupelling-hearth with a blast of steam instead of air. It was not found advantageous to enrich this lead by the further use of zinc. At the Clausthal works (*Preuss. Ztschr.* 16, p. 58), the zinc alloy was similarly liquated, the liquation-lead allowed to cool slowly, and then the zinc crust which formed was removed, after which the lead was added to the original work-lead before the third addition of zinc. At times, it was separately desilverized by the addition of 40 lbs. zinc per 250 cwt. lead. The zinc-dust remaining from the liquation was smelted in a lead matte-furnace, with the addition of 100 per cent of lead matte and 100 per cent of copper slag, for work-lead which was cupelled. The operation was performed at the lowest possible temperature, with a very low pressure of blast—only 3 lines German, or about 6 millim. of mercury—so that the throat of the furnace remained dark, and there was no considerable formation of fumes. The operation was conducted without difficulty, and, by collecting the fumes in a wet sack hung in the chimney at the end of the condensation-canal, the loss of silver through volatilization was found to be scarcely worth mentioning. The litharge and silver obtained by cupelling the rich lead from the smelting process were very rich in copper, so that it would, perhaps, be well to add a little iron pyrites in smelting the zinc-dust, by which means the copper could be collected in a matte, from which it might be profitably separated, while it cannot be obtained from the litharge.

Another method of treating the zinc crust in the dry way has been invented by M. Roux, and was described in this journal, 1869, Vol. VII., No. 18. The alloy of lead and silver is liquated until most of the lead is removed; the residue is then broken into fragments, mixed with its weight of litharge, and thrown upon the bed of a reverberatory furnace. This bed consists of bricks made of fire-clay and bone-ash, supported on iron plates, or it may be made by covering the iron with a lining of fire-clay and graphite. The charge, covered with a little litharge, is brought to a low red heat, when a part of the litharge is reduced by the zinc, producing lead, which absorbs the silver and flows out of the furnace. When the lead ceases to flow, the tap-hole is closed, and the furnace heated so as to liquefy the litharge, oxide of zinc, and all foreign matters. Then the tap-hole is again opened, and the remaining lead drawn off, after which the impure litharge is allowed to flow out into a separate receptacle or upon the floor of the furnace-house. The rich lead thus obtained is cupelled, while the impure litharge is reduced in a shaft-furnace. While the silver and lead are quite completely reduced by these dry methods, the zinc is lost, and, by passing into the rich slags and the condensed fumes, renders them more difficult to work over, so that it is very desirable to find some reliable way of separating the zinc in a useful form, at the same time leaving the lead and silver in such a state that they may easily be treated.

The process described by Bergholz, as the one followed at the works of Herbst & Co., in Call, seems to accomplish this object in a rational manner, and, although the works were not yet supplied with all the necessary apparatus, experiments on from five to six cwt. of materials had given a very satisfactory result. The zinc-crust removed from the desilverizing-kettle, after the second and third additions of zinc, is liquated in a kettle, yielding liquation-lead, with 0.0125 per cent of silver and 0.6 per cent of zinc, and upon this lead floats the rich zinc alloy. After all is melted, the temperature is raised almost to a red heat, and the zinc and lead in the alloy begin to oxidize. As soon as the oxidation is almost complete the liquation-lead is drawn off into a lower kettle, leaving the oxides and nearly all the silver behind. As already mentioned in our second article, this liquation-lead is added to the original lead in a subsequent process, before the second and third additions of zinc. When about 30 cwt. of the argentiferous oxides have been collected, they are treated with hydrochloric acid, at first in the cold, and afterward at a moderate heat. When complete decomposition has taken place, the temperature is raised, and as soon as the whole of the water has evaporated, which is shown by the mass becoming thickly fluid, the zinc crust removed after the first addition of zinc, containing the zinc and lead in the metallic state, is added to it. Thereupon the chloride of lead and the metallic zinc react, forming chloride of zinc and metallic lead, which latter absorbs the silver and forms a rich lead, with 1.5 to 2 per cent of silver, ready for cupellation. The operation requires about twenty-four hours from the time the water is gone; and the amount of acid used is 50 per cent of the weight of oxides treated. The rich lead is then drawn from the upper into the lower kettle and ladled out into moulds. The resulting slag contains 20–25 per cent of chloride of lead, 0.06 to 0.09 per cent of silver, and the rest is chloride of zinc and copper. To obtain the zinc, lead, silver, and copper from this slag, as well as from the slag produced in refining the desilverized lead with sulphate of lead and salt, which operation was described in our last article, the two slags are mixed and subjected to a process of lixiviation. This is performed in a wooden tank, divided by walls into four compartments, lying in a row and communicating with each other.

Water, to which some hydrochloric acid has been added, is admitted into one of the end compartments, while the slag is placed in the other end of the tank, and, after some time, it is transferred to the next compartment, and its place filled with slag, and so on. By this means, the fresh water comes into contact first with the partially lixiviated poorer slag, and afterward flows into the compartments containing the richer slag. The hydrochloric acid in the water converts the oxichloride of zinc into neutral chloride and dissolves it, and at the same time the chlorides of copper and silver are dissolved—the latter in consequence of the presence of other chlorides in solution. The chloride of lead forms, with the sulphate of soda, insoluble sulphate of lead, which remains behind. Sulphuric acid is added to form sulphate of lead, in case of a deficiency of sulphate of soda. The lye is then admitted into a tank, where any sulphate of lead still in suspension may settle, and then it is conducted into a tank filled with copper bars, by which the silver is precipitated. After this, the copper is precipitated in another tank with iron, and the lye is then treated with chlorine gas, to convert the iron into perchloride. Enough caustic lime is then added to precipitate the iron as sesquioxide, and after this oxide has completely subsided the lye is admitted into a tank, where it is brought to a boiling heat by steam, and the zinc is likewise precipitated by caustic lime.

Calcined marble is used to secure a pure lime, which should not be added in excess, lest the oxide of zinc may be impure. The oxide, when washed and dried, is ignited in a small retort-furnace, and is then ready for commerce. Superheated steam has also been used in treating the rich zinc alloy. By this agent, the alloy is separated into rich lead and argentiferous oxides, which latter are pulverized and sifted, to separate the metallic particles which are put with the rich lead. The oxides are treated with hydrochloric acid, at a temperature of 64° Fahrenheit, when the zinc oxide is dissolved, leaving the lead, antimony, and arsenic as insoluble oxichlorides or subchlorides. These are collected and washed by decantation, and are then fused in an iron kettle, where metallic lead, rich in silver, settles to the bottom. The lighter slags are reduced in a reverberatory furnace, with lime and coal, to an argentiferous lead, which is again desilverized with zinc. The chloride of zinc might be treated with lime, as above described.

We have now gone through the list of the published methods of treating argentiferous lead with zinc, and most of the methods have been used on a large scale with success. The variations which occur in the modes of mixing the zinc and lead arise from the endeavor to obtain as thorough an admixture as possible at a proper temperature—two very important points. In the operation of removing the zinc from the poor lead, various agents have been employed, and superheated steam will probably prove most efficient, on the score of economy and convenience, although the alkaline chlorides and bisulphate of soda have been very successfully used. In any event, the methods of refining the lead which are carried on in the desilverizing-kettle and the reverberatory furnace are to be preferred to such a method as Flack's, which requires a shaft-furnace, thus entailing a greater loss of lead and expenditure of labor, while the progress of the operation cannot be so easily examined, and the quality of the product may be seriously affected by slight changes in the shape of the furnace, from burning out, and other causes.

In concluding this article, it will be well to give a comparison of the results obtained by cupellation, Pattinsonage, and the zinc process. For the particulars, the reader is referred to the *Preuss. Ztschr.*, 16, p. 61, *et seq.* In establishing the comparison as there given, with particular reference to the silver-works of the Upper Hartz region, two points are particularly to be observed:

1. The quality of the products.
2. The economical results of the process.

Illing gives a long list of analyses of lead obtained by the different processes, which show that the lead from the desilverization of zinc, even when only refined in the desilverizing-kettle, is decidedly better than the lead obtained by the old process of cupellation and reduction, since the former, with nearly the same amount of antimony, contains much less copper than the latter. The lead obtained by refining the desilverized lead in the cupelling-furnace was, on the other hand, at least equal to refined lead from the Pattinson process, because it contained but little more antimony, and much less copper. As regards the economy of the methods, the cost of working 1 cwt. (1 centner) of the lead was found to be:

By cupellation,	7½	groschen	= 18¾ cts. nearly.
" Pattinsonage,	15	"	= 37½ " "
" zinc process,	10	"	= 25 " "

And the loss of lead was:

In cupellation,	9.	% of the lead treated.
" Pattinsonage,	3.5	% " "
" zinc process,	3.73	% " "

The zinc process yields as good a product as the Pattinson process, and affords a saving of 40 thalers 18 groschen (nearly $29.50) per 100 cwt. of lead in the ore, and a saving of nearly twice that amount as compared with cupellation and reduction. At the same time, the lead is sooner ready for the market, so that less capital is required, while fewer rich intermediate products have to be treated. The zinc process is less dependent upon the purity of the lead than the Pattinson process, because the desilverized product only is refined, so that the products resulting from working up the lead refining-scraps are poor, and can at once be sold. Only one fourth as many laborers are required as for the Pattinson process, and these are less exposed to the injurious influence of the lead-fumes. The economical advantages of the zinc process increase also with the increasing value of fuel. Gold can be also very thoroughly separated from lead by means of zinc.

Oil-Wells in the East.

THE Rangoon *Times* gives the following account of the earth oil-wells in Ramree, British Burmah:

"Captain Plant, deputy commissioner in Arracan, but now located in Myanoung, wrote to the Arracan *News* before he left Akyah, bringing to notice the fact of the existence of several earth oil-wells in the district of Ramree. Captain Plant visited the wells, but does not mention how many there are. The deepest well was thirty-two cubits, or forty-eight feet deep. The wells were supported by a strong timber-work. But in order to get up the oil two lads had to descend it; one went half-way down, the other clear down to the bottom, who scooped up the oil out of a hollow in the ground four inches square. The produce of the single well which engaged Captain Plant's attention was stated to be a dozen quart bottles a day. This oil sold at the rate of five-quart bottles per rupee. As might be expected, the health of the lad who went down the well, and who was eleven years old, appeared to suffer from the effects of the noxious gases which he inhaled while below. Of course this deprivation of pure air will tend to shorten his life. New wells, says Captain Plant, are constantly being dug, and yield a remunerative out-turn. The oil when brought up looked like a blue whitish water, with a dense-colored sediment. The surface liquid was the oil, and what seemed to be sediment was pure water. The oil was then poured into a receiver, giving out beautiful brilliant straw-colored rays—the smell was strong, pungent, and gaseous. When used for lights it is admitted to be dangerous and liable to flare up. This inflammable quality in the earth oil of Ramree will prevent its ever becoming an article of commerce. Since the unfortunate Abergele accident occurred in Wales, more than half the insurance offices in England have refused to take any risk on goods of this nature. The earth oil-wells of Upper Burmah are of far greater importance than any thing found in these provinces. The wells number several hundred, and the supply of petroleum from them is practically unlimited. The depth of these wells is two to three hundred feet, and the oil at the bottom appears of a beautiful olive-green color, turning brown on exposure to the air on the surface of the ground. The demand for this oil has considerably diminished since the discovery of the petroleum springs in Pennsylvania.

Fire-Protection and Water-Supply.

IT is the opinion of many that the water-supply and fire-protection of towns should be combined in one system. Indeed, it is a matter of question whether the maintenance of an elaborate municipal fire-brigade, with its steam fire-engines and appurtenances, is not false economy. There are, of course, numerous instances where steam fire-engines are indispensable; but, in many cases, a well-organized, limited fire corps is all that should be necessary. But there are cases in which, from the nature of the locality, etc., figures will prove unfavorable to this statement. In the majority of instances, however, we believe that they will exhibit a striking economy. We are, therefore, glad to note the success that has attended the Holly system for the water-supply and fire-protection of cities. We cannot speak otherwise than eulogistically of the completeness of the machinery and arrangements designed by Mr. Birdsill Holly, of the Holly Manufacturing Company's Works, Lockport, N. Y. This gentleman has for some time devoted his attention to the construction of water-works without the costly encumbrance of reservoirs, etc., and his elliptical rotary-pump, designed for this purpose, is a machine of much merit. Wherever an application of his plan is possible, a turbine water-wheel, of improved construction, is erected, with the greatest possible fall attainable

That of the Lockport Water-works has a fall of nineteen feet. Such a heavy head of water is greater than in most localities where this system has been carried out. The turbine drives a set of pumps, the whole being erected in a frost-proof structure. The delivery takes place through properly constructed mains and services, provided with fire-hydrants at convenient intervals. By means of a suitable arrangement of safety-valves, pressure-gauges, and registers, perfect uniformity of flow and complete control of the water is obtained. A water-telegraph is arranged, by the action of which an abundant supply of water is provided in case of fire.

As the subject of the water-telegraph has been referred to, a description of the system adopted in the Paris Exposition buildings, of 1867, may not be without interest. Reservoirs, pumps, and other arrangements, furnished an abundant supply of water. The various columns supporting the roof were employed as conduits, each provided with a cock and a coil of hose. A brigade of firemen having been counted off on duty, each man was provided with a fire-clock, which he held strapped to his hand by means of a leather thong. The clock was of ordinary construction, the only difference being that inside it, at the back of the works, was fixed a cardboard disc. Each water-column was provided with a clock of similar construction. The stationary and portable ones were timed synchronously by the Superintendent. At every interval of ten minutes or a quarter of an hour, as the case might be, the fireman was instructed to halt in his rounds, and adjust his fire-clock to that of the stationary one affixed to the water-column adjacent to his beat. Projecting pins were so arranged in the portable clock as to fit accurately into insertions in the stationary time-piece. By this means, on the two clocks coming into contact, the inclosed card in the portable one was punctured. Thus, if the fireman was ordered to pass the water-column at intervals of ten minutes, at the expiration of his duty, on delivering up his time-piece to the Superintendent, it was unlocked, and the card inspected.

If punctured at regular intervals, indicating ten minutes each, it showed that he had been attentive to his duties; otherwise not. If a fire occurred in any part of the vast building, and water was drawn off from any of the columns, it was so arranged that both the circumstance and the approximate locality of the fire were instantaneously indicated by the stationary clock, and was at once detected by the firemen at the intervals of their inspection. We refer particularly to this subject on account of the interest now attached to the question of fire-telegraphy. Owing to the great precision and attention given to details, the system of water-supply and fire-protection at the French Exposition worked admirably.

But to return to the subject in hand: the Holly system of water-works has been carried out in various cities, with economical results; among these are Lockport, Auburn, Gouverneur, Minneapolis, and Binghamton. Lockport is the site of the Holly Works, and the earliest example of the application of the system. We may therefore make mention of its water-works in illustration of the effectiveness of the entire system. The Lockport Water-works were constructed in 1863, under a contract with the City Corporation. The wheel-house is a circular brick building, located about 20 feet below the State Race, and is 20 feet in diameter. In the lower story is placed one of B. Holly's Patent Improved Turbine Water-Wheels, under a head of 19 feet. This wheel drives one of Mr. Holly's Patent Rotary-Power Fire-Pumps. A 10 inch main leads up an elevation of about 40 feet to Main-street, a distance of 30 rods, and the water is thence distributed through smaller pipes of 8, 6, and 4 inches, through the streets protected by the works. Aside from the compactness and efficiency of this machinery, an ingenious invention of Mr. Holly, of indispensable value, secures an uniform pressure of the water in the pipes. This pressure-gauge, or register, controls the water-wheel gate, so as to give just the required pressure from 20 to 200 pounds, and which makes the works equivalent to a reservoir four hundred feet high. The agreement of the Holly Company, in the contract for the erection of the works, stipulated that, from a hydrant set at a point 50 feet above the pump, a stream of water should be thrown through 100 feet of hose 100 feet high. Upon the trial, the stream was thrown not only over the test-pole placed for that purpose, but full 75 feet higher, as near as could be estimated, when the hose burst! Next, two streams were thrown at the same time, about the same height, when the hose again gave way. Then four streams at one time were thrown over the test-pole. The pump threw at the same time from nine hydrants a stream from each, through nozzles from ¾ to 1¼ inches in diameter, over the roofs of any of the buildings. The works were promptly accepted by the city, the trial being rather a test of the hose than of the power of the machinery.

Timber Rot.

BY DR. ADOLPH OTT.

IT is generally supposed that the rotting of timber is merely induced by the action of the oxygen of the air. From analyses made of sound and decayed oak, it has been shown that for every two equivalents of hydrogen oxidized by the air, one equivalent of carbonic acid had separated. It may therefore be inferred that the decay or rot of timber does not arise from fermentation; but is rather a chemical process. Others admit that microscopical parasites of vegetable nature play an important part in the decay of wood; but consider the presence of albuminous matter in the sap as necessary, which, according to them, must also be first in a state of decomposition before it allows the growth of those organisms. In order to throw light upon this most important subject, we propose first to tabulate a number of well-observed facts. Sound timber, when immersed in water, without access of air, will withstand decay for almost an unlimited time. This is proved by the piles upon which the dwellings on the Canaries rest, which were erected in the time of the Conquest in 1402, they being just as sound now as if they had been freshly felled. Roots of trees that have been submerged in marshes are rarely found decomposed. This is stated to be the case with the utensils discovered in the lake dwellings of Switzerland, Bavaria, and Lombardy, which must be at least ten thousand years old. Hartig also describes a cypress-stem with over three thousand rings, representing the same number of years, which, though submerged, had only partially turned into brown coal.

With respect to the action of the atmospheric air, it may be asserted that the same, even when moist, will not produce rot, if the wood has been well steamed, or exposed to the action of running water for a sufficient length of time. In England it is customary to lay the timber destined for threshing-floors and wainscoting in fresh water for several weeks. When again dry and not exposed to damp, such timber will endure for an incredible period of time.

This tends to demonstrate the fact that the substance which induces decay must be foreign to the timber itself. This substance is the juice that is chiefly contained in the vascular tissue, which forms a link between the bark and the wood. The composition of this sap varies according to circumstances, as the variety of the tree, climate, season, ground, etc. The following are analyses of the sap:

In 100 Parts.	Sap of Elm Tree. Vauquelin.	Sap of Cow Tree. Solly.	Dried sap of bark of *Antiaris toxicaria*. Mulder.
Albumen,	.....	3.06 (*a*)	16.14
Dextrin,	.....	4.37 (*b*)	12.34
Sugar,	.....	.....	6.31
Resin,	.....	.....	20.93
Galactin,	.....	30.57	.....
Myricin,	.....	.....	7.02
Antiarin,	.....	.....	3.56
Organic Substance (not determined),	0.10	.....	.....
Potassa with Organic Acid,	0.87	.....	.....
Carbonate of Lime,	0.10	.....	.....
Extractive Matter and Salts,	.....	.....	33.70
Water,	98.93	62.00 (*c*)	.....
	100.00	100.00	100.00

(*a*) Gluten and Albumen, according to Solly. (*b*) Dextrin and Salt. (*c*) Water and Butyric Acid.

Remarks.—The Cow Tree (*Galactodendron*) is a native of the Cordilleras of Venezuela; it furnishes, by incision, an enormous quantity of a white, thick liquid, which has the taste and some of the qualities of real cow's milk. The *Antiaris toxicaria* belongs to the same family as the former—namely, to the nettle-worts, and it is singular that it furnishes a most deadly poison, which has been the subject of the most harrowing stories. (Jussieu: *Elements of Botany.*)

Unfortunately we possess only one analysis of a tree indigenous to North-America; however, the same tends to show that the amount of albumen, if the non-determined organic matter must be considered as such, is exceedingly small, and with respect to the other trees, these analyses prove that the albumen does not constitute the chief part among the ingredients of the juice. How unjustifiable is it, therefore, to attribute in every instance the decay of timber to the albumen present in the sap, as if it was the only substance liable to spontaneous decomposition, or affording the vegetation of fungi and lichens! How unfounded is the assertion of Mr. Joseph B. Lyman, who, in an article on the preservation of timber, states that "wood is mainly made up of woody fibre and a substance full of nitrogen"! (*vide Working Farmer*, November 1st, 1868).

In regard to the amount of sap and air contained in the oak and poplar, we possess the following data from Count Rumford:

	Wood.	Sap.	Air.
Oak,	0.39353.	0.36122.	0.24525.
Poplar,	0.24289.	0.21880.	0.53831.

The German botanist, Schacht, in all instances of decayed timber, has met with fungi and lichens. The destruction of timber by decay, after the same has been hewn, must therefore be considered as being produced by similar causes which brought on the disease of the vine, potato, mulberry-trees, and other cultivated plants, which make the years 1845, '48, '53, '57, and others, forever painful to the memory.

That the juice should be in a state of decomposition before being capable of generating those organisms seems doubtful, since this has not been found the case in other and well-studied modes of fermentation. The morel, a species of mushroom, will also attack perfectly sound wood. Hand in hand with the spread of the fungi continues the decomposition of the ligneous tissue. Access to moisture and air, as also a certain degree of heat, are necessary. In regard to the air, the fungi require oxygen for their generation. When air-dried, steamed, or chemically treated and afterward dried wood commences to rot, it is a sign that moisture has again penetrated; for it is scarcely to be admitted that in all these cases the sap had been entirely removed. Timber decomposes the easier the more sap it contains, and if green trees are hewn when the vessels are overflowing with juice, one may look with certainty for diminished durability of the timber. Timber is not always the more durable, the more dense it is, but rather when the even fineness of the grain continues to the pith of the stem.

The Roman historian, Pliny, considers the resiniferous woods as the most durable. Indeed, nature shows that this is frequently the case. The resiniferous red and white pines of Oregon and California are considered first-class ship-timber, so much so that entire vessels have been constructed from the denser qualities. The yellow or long-leaved pine, in dry situations, is extremely durable, and is preferred to oak of any kind, where a lighter yet solid wood is required. The white or northern pine, which grows abundantly in every Northern State of the Union, from Maine to Minnesota, reaching often to an altitude of one hundred and eighty feet, with a diameter of six feet or more, is said to retain its properties as long as the very best description of oak. Among the various processes now in use for the preservation of timber, there is, perhaps, none which deserves the endorsement of both scientific and practical men more than the "Heinemann" process. The wood impregnated by his process is especially fit for superstructures of railways, piers, and underground work. The process itself has been described in the February number of the *Manufacturer and Builder*, and consists in impregnating the timber with resin, which is the solid residue obtained by the distillation of turpentine, after the sap has been removed by means of atmospheric pressure. The great preservative action of resiniferous bodies is especially shown by the pieces of amber thrown ashore on the coast of the Baltic. They sometimes enclose insects which, although they must have been imbedded in the amber for thousands of years, look as fresh as if they only died within a few days.

The New Hell-Gate Drilling Apparatus.

SINCE the initiation of proceedings showing a determination to get rid of the dangerous and unsightly obstructions at Hell Gate, mechanics, engineers, and inventors generally have turned their attention to the construction of apparatus by which the cleaning away may be done speedily and cheaply. Scores of models and plans have been submitted to General Newton, to whom the supervision of the work has been entrusted by the Government, and the projector of each has been loud in his explanations and enthusiastic in his assertions of the feasibility of his invention, and its superiority over all others. Some of the models submitted were really good in many respects, but fell short of actual requirements in others. Among the models presented for consideration was one invented by Mr. B. G. Martin, which has met the approval of General Newton, and which appears to combine the elements of durability, simplicity, and feasibility in an eminent degree. The apparatus, when in position for working, may be said to consist of a double cylinder setting on the rock or river-bed, and guarded from the current and passing vessels by a strong cutwater at either end. The outer cylinder is formed of stout piles, with heavy metal plates between them. The piles are connected in pairs by metal bands, which slide up and down on bars set into the piles. The latter, although thus joined, are, to a certain extent, independent of each other, and thus enabled to rest on the bed of rock, whatever may be the irregularities on its surface. The plates, which slide between the piles in mortices, are made of heavy metal, the lower one being pointed, so that it may sink into the bed or catch on the rock. These metal plates come only high enough to form a sort of obstruction to any undercurrent, and above them will be slides of heavy wood. The inner cylinder is formed entirely of wood, made in sections somewhat similar to the other cylinder, and held together by stout metal bands. Between the cylinders will be a filling of a peculiar cement, which will prevent the water entering the inner cylinder. The cutwater at either end is formed like a sharp-bowed vessel, the sides of which meet at the sides of the cylinder. When these cutwaters are joined, they will form a diamond-shaped guard to the cylinders. On the cutwater apparatus will be located the engines and machinery. As soon as the filling between the cylinders is completed, the water will be pumped out of the inner cylinder, and thus will be formed a well-hole clear to the bottom, in which the drilling may be done for hours, if necessary. When it is required to change the location, the workmen merely fit a water-tight bottom to the inner cylinder, the plates between the piles of the outer cylinder are pulled up by means of chains which are attached to the plates, the water is thus allowed to flow in under the bottom, and the cylinders are floated up. The entire apparatus can then be floated to the desired location and sunk as before.—*New-York Herald.*

An Explanation.

TO THE EDITOR—SIR: Occasionally I hear a slight complaint from some critical person who receives the JOURNAL free that my letters are trivial, and that I do not give sufficient "opinions about the mines." This cavil opens up a subject not uninteresting, to which I shall devote a few words. It is a notorious peculiarity of the Pacific Coast that the inhabitants are crazy to hear what strangers think about the country, and yet never attach the slightest importance to opinions that do not agree with their own. In the mining districts this is especially the case; and perhaps I am made to feel it more than another because my profession makes it necessary. People think that I should have an opinion, and an official one at that, concerning every boulder, crystal, seam, lode, ledge, reef, and hole in the ground, west of the Rocky Mountains. I take occasion, therefore, to renew an explanation which I have often had occasion to make, and to rectify some very common misapprehensions concerning both my official and my editorial business.

1. It is impossible for the United States Commissioner of Mining Statistics to collect individually all the facts embodied

in his reports. Nor is the accumulation of details in this manner the object of his annual tour through the mining districts. It is my policy to avoid as much as possible the collection of such information by means of travelling agents. Neither myself nor an appointee of mine, going into a district for the first time, would be able to comprehend its conditions and estimate its past and future as well as a competent person, resident upon the spot. On the other hand, it is quite necessary for the Commissioner or some trusted assistant to visit the principal districts, in order to give directions to agents, examine personally into points of special interest, and cultivate the acquaintance and learn the views of prominent men interested in mining. In attempting to carry out this work over the immense department intrusted to him, the Commissioner must be his own judge as to the points necessary to be visited. Every thing he certainly cannot see, in the course of a single summer. In fact, at least three successive annual tours would be required for one single superficial inspection of the whole field.

2. It must be remembered that examining single mines, and reporting as to their value, is not properly a part of the duty of the Commissioner—especially when the property is entirely undeveloped. Some mine-owners seem to think themselves free clients of that officer, entitled to a thorough examination of all their claims, and a report thereon (favorable, of course), which will enable them to "develop," that is to say, sell. But I need only point out what an outrage upon private rights would be the *condemnation* by the Commissioner of a few such claims, to show that the whole matter lies outside of his work. It is his duty to chronicle, for the information of the government, the annual progress and the changing prospects of the mining industry upon the public domain, the discovery of new districts, and the history of old ones; to observe and report the difficulties which may interfere with the success of mining, and to recommend such remedies as are feasible, and within the proper sphere of government; and, finally, to diffuse as much useful information as possible, through the medium of his reports, among the miners themselves. If, in the course of the discharge of these duties, he describes individual properties, as incidental to the main object, well and good. Indeed, his work would not be complete if important *producing* mines were passed by without notice, or new and promising districts entirely neglected. But there are matters more imperatively necessary than either of these; and two, above all, demand this year the Commissioner's attention. The first is the imperatively necessary amendment of the mining law of the United States; and the other is the consideration of processes and apparatus employed in the mining and reduction of gold and silver in this country. To these points I am principally devoting myself; and I hope the report of next winter will justify the wisdom of my course.

3. Meanwhile, it is a matter of some difficulty to decide what I shall write editorially in the columns of this JOURNAL. My opinions I hold as far as may be in suspense, until I shall have completed the observations on which they are to be founded; my impressions I hesitate to record, lest, upon mature reflection, I may come to different conclusions. Add to these mental perplexities the physical difficulty of interjecting, among the fatigues of staging above ground, and climbing, crawling, and dangling under ground, grave and well-considered essays on important themes, and you will begin to see how it is that so many of my letters are "trivial." Sensible men ought to thank heaven that, under the circumstances, I deal so little in "opinions." At this blessed minute, for instance, having outlived the ride of a hundred miles in a "jerky" (fitly named) from Austin to this place, and finding myself stranded for half a day, waiting for the daily tide of the Western express, I make use of the never-failing courtesy of Wells, Fargo & Co. to write in their office a few things which I have thought out already. As for setting myself down to study my note-books and elaborate fresh wisdom therefrom—no, I thank you, not till I have had a little sleep, and the layers of my brain have settled themselves again according to their specific gravity. At present, it would be difficult to distinguish the heavy precipitate of sense from the foamy scum of nonsense.

After a rapid trip through Washoe, Grass Valley, etc., to San Francisco, I shall probably go northward, and visit the mining districts of Oregon, Idaho, and Montana. My letters hereafter, as heretofore, with all respect to the critics, will be good, bad, or indifferent, according to the state of the roads, the quality of the meals, and the number of hours of tired Nature's sweet balmy what-d'ye-call-it vouchsafed to the writer. R.

ARGENTA, NEVADA, July 8th, 1869.

Chlorination of Silver Ore at La Dura, Sonora, Mexico.

OUR contemporary, the *Mining and Scientific Press*, publishes an article under the above title from the pen of Ottocar Hoffman, which is very methodically arranged. We consider it well worthy of reproduction. It runs as follows:

The favorable result obtained by the chlorination process of Kustel and Hofmann on a small quantity of ore in San Francisco, induced Mr. E. B. Smith, the Superintendent of La Dura, to engage me for the purpose of introducing that process at the La Dura mines.

These mines are situated on the Yaqui river, about 140 miles east of Guaymas. On our arrival, in consequence of a freshet, we found the Yaqui sixty feet above the normal stand, the Hacienda with all appertaining buildings swept away, leaving only the foundation and the battery. The furnaces, Varney's pans, boiler, etc., were buried in the river. The energy of Mr. Smith, however, replaced the old works in a comparatively short time, only substituting chlorination for amalgamation.

The complete property of the Pittsburg-Sonora Mining Company consists of three veins, La Dura, Kamona, and Gaxiola. From each of them ore is treated, but principally from the Kamona, which is the more favorably situated, and also better opened. Ore is abundant, and consists of light and dark fahl ore, argentiferous zinc-blende, galena and some iron pyrites. The amount of silver varies from $60 to $130 per ton. Of zinc-blende there is about eight or nine, and of copper three to four per cent in the ore. Galena and the other base metals formerly caused a great loss of silver in amalgamating, destroying at the same time the pans, and quicksilver to a considerable degree.

The present manipulation at La Dura is executed in the following way:

1. THE ROASTING.—The ore, crushed dry through a sieve of 35 meshes, in charges of 800 pounds, is introduced in a furnace thirty feet long, in three compartments ten feet each by eight feet width. The bottom of each compartment is two and a half inches above the preceding. The charging is effected through the roof of the last hearth, where the ore is prepared by a moderate heat. After three hours the charge is removed to the second hearth, and a new one introduced in the former. On the second hearth the ore comes soon into a dark red-hot condition, requiring more stirring than in the preparatory compartment. The ore gets rid of the greater part of its sulphur, and it is necessary to change sometimes the ore from the end of the hearth to the front, nearer the fireplace. After a lapse of another three hours, the ore is moved again, now to the first hearth, nearest to the fireplace. First, an oxidizing roasting is applied to the ore for two hours, after which the firing is stopped, three to four per cent of salt is introduced, and the ore chloridized at a low temperature for one hour. A low heat is here required on account of the volatility of the chlorides of copper and zinc, by which more silver would be carried off. Ten minutes before the discharge, half of each compartment is cleared by shovelling the ore toward the fireplace, and moved over on the next hearth as soon as the discharge of the roasted ore begins in the first compartment, so that when the discharge of 800 pounds is finished, each hearth appears already charged.

These furnaces have the advantages of not only saving fuel, but requiring a less skilful roaster to do good work. A chloridizing roasting is not necessary, unless for the purpose of gaining the copper.

There are two roasting furnaces at La Dura, capable of roasting five tons of ore.

2. MOISTENING OF ORE—THE TANKS.—The roasted ore, after being cooled down somewhat, is first moistened, only so much as to prevent dusting in the next operation of throwing it through an inclined sieve. The lumps separated hereby are pulverized and returned to the roasting furnaces. What fell through the sieve is moistened by further addition of water to such a degree as to allow it to be pressed into a ball without adhering to the hand. It is mixed by two workmen, by means of shovels, and then introduced into the chlorinating tanks. Carefully charged, the ore lies loose enough to permit the gas to have an easy passage.

The tanks are 9 feet by 2½ feet deep, made of 1½-inch planks, lined with a hot mixture of pitch and tar inside. The bottom is somewhat inclined from both of the long sides toward the middle, forming a flat channel lengthways. Above this there is a false bottom formed of wooden staves, partable in segments, and covered with a piece of coarse canvas, for a filter. These tanks are placed parallel with the long sides of the building, having as front one of the short sides, which stands 1½ inches lower than the opposite end. Below the false bottom in front, each tank has a leaden cock, which, by means of an india-rubber hose, may be connected with the chlorine gas generator, when the ore is ready to be chloridized. The same cock will also serve for discharging the leach. On the opposite side, also below the false bottom, two pipes are inserted, one provided with a lead cock, communicating with another chlorine gas-pipe, the other leading to the water-reservoir.

The upper rim of the tank is lined with india-rubber, on which the cover is fastened air-tight by means of screws. This mode of shutting up the chlorinating vat air-tight is much preferable to the old way of pasting the cover with dough or clay, as is done in gold chlorination. It is cheaper, cleaner, quicker, and more perfect.

3. THE CHLORINATION.—The silver contained in the ore is found after roasting to consist of chloride, sulphate, and sulphide of silver. Exposed to the action of chlorine gas for several hours, all is converted into chloride of silver.

The chlorine is generated in the usual way, by peroxide of manganese, sulphuric acid and salt. It is conveyed through a lead pipe into the washing apparatus, and from thence through two pipes along both sides of the chlorinating tanks. Salt and manganese are cheap in Sonora; the sulphuric acid, however, is expensive. Under such circumstances, the object is less the utilizing of every particle of salt, than to produce the largest quantity of gas in the shortest time. For this reason I use more manganese and salt than are required by the chemical proportion—namely: 32 pounds of sulphuric acid, 16 pounds of manganese, 16 salt, and 16 pounds of water, which proportions are sufficient to chloridize 2½ tons of ore. The chlorine enters the tanks from two sides. After 2½ or three hours, the gas will be observed to come out through a pipe fixed above the ore, showing that the chlorination is finished. All pipes are shut off now, and the gas is allowed to act on the ore for five or six hours. After this time the upper pipe is brought in connection with the lead cock below the false bottom of the next prepared tank, by means of a rubber hose, and the surplus of chlorine forced over by the water entering below the false bottom from the reservoir. Using over the surplus of chlorine, the expense of chlorination is considerably reduced, and the workmen are not at all molested by the gas. The next tank is now partly filled with chlorine, and the lacking part must be replaced by fresh generation. Generally 20 pounds of acid are here sufficient in place of the above 32, taking the ingredients in the proportion before stated.

4. LEACHING OUT OF THE BASE METALS WITH WATER.—After all the chlorine has been displaced by the entering of water, the latter is now shut off, the tank uncovered, the cock in front opened, and water conveyed on the top of the ore, which must be kept submerged several inches; regulating the inflow of the water so as to be equal to the outflow. The leach is led into a tank of masonry, coated inside with pitch (12 feet by 6, and 2 feet deep), so long as it appears colored green from the chloride of copper. The copper is precipitated in metallic condition by means of old iron. The leaching continues till a solution of sulphide of sodium shows no precipitate of base metals. In this case the leaching with water is finished, and the next process follows.

5. LEACHING OUT CHLORIDE OF SILVER WITH HYPOSULPHITE OF SODA.—This salt, possessing the power of forming a soluble compound with the chloride of silver, must be used in a diluted condition, dissolved in water. The leach, containing silver, is conducted into two tanks, each 5 feet by 3, and 4½ feet deep, coated with pitch and tar. The silver is now precipitated by a solution of sulphide of sodium as a brownish black substance. A vigorous stirring accelerates the precipitation. A surplus of the precipitant is injurious. The liquor must appear clear, and be neutral—that is, an addition of some more sulphide of sodium should not darken the liquid, neither should this occur by adding an argentiferous solution. The clear liquid, including the sulphide of sodium used, is now again in the form of hyposulphite of soda, and ready to be used over.

The lixiviation is stopped when, in the clear liquor, taken in a glass tube with addication of some sulphide of sodium, no precipitate is obtained.

6. TREATMENT OF THE PRECIPITATED SULPHIDE OF SILVER.—A few minutes after stirring, the liquor appears clear above the precipitated sulphide of silver, and is drawn off by means of a syphon into a reservoir, for the purpose of using it again as a solvent. The sulphide of silver is conveyed into canvas bags, filtered, washed with warm water, pressed, dried and retorted in earthen pots connected with like vessels, kept cool in order to concentrate the silver, and to regain the sulphur, which serves for the preparation of fresh sulphide of sodium.

The retorted silver is melted in black-lead crucibles with the addition of some iron. In this operation some iron matter is obtained which contains from 4 to 5 per cent of silver and is thrown into the battery with the ore.

7. GENERAL STATEMENT OF RESULTS.—The extraction of silver, in this manner, is very close, tailings assaying from 4 to 5 dollars per ton. The silver is 900 fine.

Compared with amalgamation, this process offers so many advantages, locally, that its general adoption in Sonora is certain. There is no difficulty in extracting the silver within 90 per cent of the fire assay. The working is easy, no power being required except for stamping. The process is cheap, and the capital required for the erection of such works comparatively small, so that companies with small means are enabled to beneficiate their ores, having besides the advantage of gaining the copper and gold separately, if present in the ore.

The silver ore from La Dura is known as the most refractory in Sonora. Its successful treatment induced Mr. M. Alsna, one of the most prominent and industrious mining operators of Sonora, to call upon me to introduce this chlorination process in his Hacienda at Trinidad, which is being done in the manner and with results similar to those above described.

The Newark and Paterson Railroad.

A TRIAL trip was made, July 28th, over the Newark and Paterson Railroad. The train from Newark left Oriental-street near the Mount Pleasant Cemetery, at about 10 A.M., having on board several persons connected with the road and members of the Newark Press. The passage to the Erie Depot in Paterson, 11 miles, took little less than an hour. The return trip was made in about 50 minutes. The train was run at a lower rate of speed than that at which trains will be run after the completion of the road, the trip yesterday being made merely for the purpose of testing the capacity of the rails. It is thought that when the road is in running order, the distance will be accomplished in about 40 minutes. Before setting out from Paterson, on the return trip, a passenger-car was attached, in which, among others, were Jay Gould and James Fisk, Jr., who had gone from this city in a special train. The road lies through one of the finest parts of New-Jersey. The grade, with the exception of about 2000 feet of an ascent of 65 feet to the mile, is almost level, and barring a couple of curves, is almost straight. The present terminus of the road in Newark is at Oriental-street. On Saturday, both tracks will probably be laid to the depot on Fourth-street, whence it is intended to run the road over the Passaic River to the proposed junction with the Erie Road, near the Bergen tunnel. The bridge over the Passaic River for this

purpose will be immediately commenced, and the junction with the Erie, it is thought, will be effected early in 1870. Through Belleville, the road passes over an easy grade. In the vicinity of Franklin, it crosses the Yautacan River, over a substantial double drawbridge erected by the Company. The excursionists over the road were yesterday received at every place they passed through with demonstrations of enthusiasm. Trains will commence running over the road on Saturday to Paterson. The full number of trips will not, however, be made until some days later.

The Theory of Ice-Machines and Refrigerators.

FOR a century or more the great problem of converting heat into power was being solved, or, in other words, the steam-engine was being brought into existence. It advanced through various stages, and appears now to have attained, perhaps if not its full growth, at least a very high degree of development. At present another problem is being solved—namely, to convert power into cold; in other words, to construct machines to make ice, or produce cooling by means of the application of power; and as the cheapest power we possess is steam-power, this is almost exclusively used, when we have the problem to produce cold by mechanical means.

The production of heat by mechanical means is very ancient. From time immemorial, the friction of two rubbing surfaces, such as a grooved board and a stick, has been used by savage races to produce fire; and the heating of the axle-trees of wagons and machinery by friction was observed centuries ago. Comparatively speaking, the practice and successful application of these phenomena have been carried out only recently. In a few factories in Germany, where there was a surplus of water-power, an arrangement was made for producing friction between two cast-iron surfaces, which became heated to such a degree that enough caloric was produced to perform the function of a heating apparatus, for various rooms; while Beaumont, in 1856, constructed a heating arrangement driven by power, where the heat was produced by the friction of a very elongated cone of soft material, well oiled, and which was placed in a hollow metallic cone,* in which it fitted exactly. Upon being rapidly revolved, a perfectly noiseless friction was the result, producing the full equivalent of heat, as determined by Mayer, Joule, Grove, etc., and to which we have often referred before; namely, one unit of heat for every 772 foot-pounds power employed. The specific heat of one pound of water, being nearly equal to that of 50 cubic feet of air, every 772 foot-pounds will heat 50 cubic feet of air 1°, and 120x772, or 92,600 foot-pounds, will heat 120x50, or 6000 cubic feet of air, 1°. If we spend this power every minute, we will have nearly 3-horse power, as each horse-power is 33,000 foot-pounds per minute. Three horse-power properly employed will therefore heat a space of 6000 cubic feet (the contents of a common passenger railroad-car) 1° every minute. But as three-horse power cannot be obtained from a locomotive, by a consumption of coal of less than 30 pounds per hour, it is seen at once that it would not be an economic operation, as so slight a calorific effect may be easily obtained from a common stove, with a consumption of less than one tenth the above, 2 to 3 pounds of coal per hour; which is the average amount burnt in a stove of moderate size, and heats a room of the above dimensions sufficiently, even in the coldest season.

One of the most remarkable facts in connection with the transformation of power into heat, is the perfect uniformity of result, whatever be the means employed to accomplish this transformation. It may be friction of solids, of solids on liquids or gases, through agitating them by means of fan-wheels or other means, compression of gases, magnetic attractions, or by retarding revolving wheels. In short, there may be any means whatever employed to retard or destroy power or motion, we will always have the uniform result; that for every 772 foot-pounds apparently destroyed, one unit of heat will have been obtained—the only condition being precaution not to lose part of the heat thus obtained, nor to consume part of the power employed in some other manner. By observing these conditions, different experimenters, each employing a variety of means, have attained such uniform results, that the number obtained—772—representing the equivalent of heat and power, is one of the most securely established in the whole field of physical sciences.

When converting heat into power, by means of the steam-engine, the results are quite different, and the most enormous discrepancies appear, one machine producing nearly 110 foot-pounds per unit of heat, another 70, another 50, and another only 35 or 40—these numbers being respectively about 1-7th, 10th, 15th, and 20th of 772. It is thus seen that steam-engines produce only small portions of the theoretical amount, and are subject to a loss, ranging from 86 to 95 per cent of what we are some day entitled to expect.†

Referring to the subject mentioned in the opening of this article, the conversion of power into cold, the following question naturally presents itself: Is this conversion practically accomplished without great loss, and with tolerably uniform results, as in the case of the conversion of power into heat? Or is it subjected to the great loss of 86 to 95 per cent, as is the case where heat is converted into power by the intervention of the steam-engine? In answer to this question, we will state that in this case there is fortunately no such loss; when converting power into negative heat, we are able to abstract with a good ice-machine a unit of heat for every 772 foot-pounds of power employed; or 170 units for 170x772, or nearly 132,000 foot-pounds. If we expend the last number of foot-pounds per minute, we spend four-horse powers, and therefore theoretically four-horse power must produce a cooling effect of 170 units of heat per minute. As one pound of water of 62° requires 30° cooling to bring it to 32°, and the abstraction of 140 units of latent heat, 170 units of heat abstracted from one pound of water at 62° will change it into ice of 32°; and thus an expenditure of four-horse power must be able to freeze every minute one pound of water of 62°—that is, 60 pounds per hour; and 40-horse power will freeze 600 pounds per hour, or 6000 pounds per day of ten working hours.

This estimate, which gives the maximum amount of ice which can be produced by a given power, shows at the same time that the reason why artificially obtained ice can compete with natural ice, is, that steam-power is so cheap. It has been suggested to make small machines, in which, by the labor of a man, ice, or at least cooling, could be produced, and such machines have actually been made, but only with doubtful success. This becomes clear when we consider that one-man power being only the 32d part of four-horse power, one man could freeze only the 32d part of a pound of water, one half ounce per minute, or one pound in 32 minutes; this would be the maximum attainable, and that by hard labor, the most perfect arrangement, precaution against loss of power, absorption of heat, etc., all more difficult to obtain on a small than on a large scale. We are compelled to come to the conclusion, that the system of refrigeration by means of power is only applicable on a large scale where steam or water power is available. To use the labor of a man to produce cooling by this system, is more expensive, as would be that of animals, in comparison to the employment of steam or water power.

If we estimate the amount of coal necessary to produce the result calculated above—namely, the production of 6000 lbs. of ice per day by a steam-engine of 40-horse power—we find that, as a horse-power requires in an economical stationary boiler and engine 20 pounds of coal per hour, the 40-horse power will consume per day of 10 working hours 800 pounds of coal. The consumption of this 800 pounds of coal producing 6000 pounds of ice, gives 7½ pounds of ice for every pound of coal, or 7½ tons of ice for every ton of coal on the supposition that each horse-power consumes two pounds of coal per hour. As, however, in the most economical boilers, a horse-power may be produced by the consumption of less coal, it is clear that it becomes possible to obtain more ice per ton of coal, which quantity can be further increased by future improvements in the steam-engine.

Having thus estimated what we may expect theoretically, let us investigate in how far the practical results obtained agree with these estimates.

In the first ice-machines, built on this principle, some ten years ago, one or two tons of ice were obtained by the use of one ton of coal, and it was at that time considered a great attainment that actually more ice was turned out than coal consumed. Very soon it was claimed that, by means of the *ether-machine*, three tons of ice were daily produced by the consumption of seven tons of coal per week; then the ammonia, machine made four to six tons of ice for every ton of coal-which production was gradually increased to eight and ten tons, while lately twelve tons have been claimed for every ton of coal consumed. An ice-machine made by Liebe, and used in England for cooling purposes in a large brewery, produced a cooling effect, which formerly, by means of ice, could only be obtained by the consumption of 14 tons of that bulky material, while the ice-machine of Dr. Vander Weyde, of this city, which is now being introduced in the United States, is, it is claimed, more economical, and will in its effect excel Liebe's when perfected and worked with superior boilers and engines.

In regard to the cost of the ice thus produced, which is the chief consideration, we may say, it consists of the first outlay, the fuel and the labor. Considering the outlay, an ice-machine with a steam-engine of 40-horse power and boiler, costs, say $5000; interest of capital, wear and tear of machine, at 15 per cent, $15 per week; labor $18, coal $7, water nothing; total, $40 for 20 tons of ice, or $2 per ton, slightly less or more, according to economy and price of coal and labor.

It is very fortunate that ice-making or conversion of power into cold, is not subject to from 86 to 95 per cent of loss, which is the case, in the conversion of heat into power, in the steam-engine. If this was the case, the tenth or twentieth part only, of ice could be made, with the same amount of machinery, fuel, and labor, as now, and the price would be at least $20 to $40 per ton, in place of $2. It is clear that in this case artificial ice could seldom compete with natural ice, which for that price could even be conveyed to the tropics. However inland in tropical climes, it commands often $100 and more per ton, if it is to be had at all, and in such exceptional circumstances, even very expensive methods of cooling may be taken advantage of.

* For description of this apparatus, see *Genie Industriel*, Paris, 1856, page 18.

† Readers desirous for details in this matter are referred to the back numbers of the *Journal of Mining* for 1869.

Magnetic Iron in Texas.

HERR A. R. ROESSLER gives the following interesting, although succinct, sketch of the geology of Texas, originally published in the proceedings of the Vienna Geological Institute, and now just republished in English by the London Geological Society:

The Territory of Texas offers a complete series of deposits from the Palæozoic Potsdam Sandstone up to the highest tertiaries. A bed of genuine bituminous coal is known to exist near Fort Belknap. The carboniferous formation has been stated to extend over 5000 square miles of surface, and to be 350 feet in thickness. The thickness of the cretaceous deposits probably exceed 1500 feet; they are distinctly stratified, generally fossiliferous, coralline limestones, particularly well developed in the Comanche summit (Johnson County), 650 feet above the level of the Rio Brazos, where they appear under the form of white hippurite limestones, overlying a bed of gray limestones, whose strata extend about 70 yards westward, and form a low slope; they are filled to the depth of 30 feet with *Exogyra Texana, Holaster simplex, Lima Wacoensis*, and other organic remains. They alternate frequently with accumulations of *Gryphæa Pitcheri* and *Exogyra Texana*, and the total thickness of this group is 75 feet. On the south side of the hill, the Gryphæa beds are 200 feet thick. The upper portions of the hill include a small quantity of *Exogyra Texana, Janira occidentalis, Lima Wacoensis, Holaster simplex*, and a *Toxaster*. The limestones above the strata abound in *Hippurites, Caprotinæ*, etc. The Texan tertiaries consist of sandstones and limestones, the former frequently impregnated with a large proportion of oxide of iron. Remains of *Zeuglodon cetoides* have been found in the hill range of the Rio Colorado, and bones of Mastodon *giganteus* and *Elephas primigenius*, and other large quadrupeds, on the banks of the Rio Brazos.

The calcareous sandstones and dolomitic limestones of the Potsdam period are of frequent occurrence in the western region of the State. They are rich in silica, and furnish marbles of superior quality.

The Azoic rocks include extensive beds of magnetic iron ore. Enormous loose masses of this ore are spread over the surface about Johnson's Creek, Llano County; a hill, rising 45 feet above the level of the Llano, is one solid mass of iron ore; its extension in depth is still unknown. The ores, very analogous to those of the Iron Mountain of Missouri, are partly magnetic, partly specular oxide of iron; they contain, on an average, 95.890 per cent of per and protoxide of iron, with 2.818 per cent of insoluble silicious substances, and give 74.93 per cent of metallic iron. This iron region is surrounded on all sides by ridges of granite, intersected by veins of quartz, and associated with red felspar, gneiss, talc, and chloritic slates. Wood abounds in the environs, and limestone and steatite may be easily procured in abundance, the extreme indolence of the inhabitants, who find an easy and profitable employment in breeding cattle, sheep, and horses, being the only obstacle to the establishment of extensive iron-works.

Superficial indications of the existence of great quantities of petroleum below the surface are not unfrequent in the environs of the "Four Lakes," Harding County. The acidulated waters of the lakes, and those of the springs surrounding them, are impregnated with carburetted hydrogen gas and petroleum. This locality belongs to the Miocene period, forming a zone 50 to 75 miles in breadth, and extending several hundred miles in length along the coast. Mr. Roessler has brought from the sources of the Rio Brazos a block of meteoric iron weighing 315 pounds.

New Property of Gun-Cotton.

ACCORDING to the *Chemical News*, it is possible to burn gun-cotton in the palm of the hand without the least danger; a delicate balance in the pan of which gun-cotton is exploded, does not swing from its poise. The same quantity of gun-cotton, if it be pressed into a cavity, explodes with a force equal to that of nitro-glycerine, and ten times greater than that of gunpowder, provided it be ignited by percussion in the same way as nitro-glycerine.

Queries.

M. H. S., WASHINGTON.—The asphaltum cement spoken of by Kustel is simply the common asphaltum of Trinidad, or its equivalent, and requires no special preparation. You may, if you like, use pitch, or the remnant of the distillation of coal-tar, as employed for pavements and roofs.

A. C. N., OF L., KAN.—"I observed slight flashes of light coming from dry lump-sugar when rubbed in the dark. Is that the crystallic 'odic' light of Reichenbach, announced some years since?" *Answer.*—It is simply frictional electricity. The same may be observed in the dark, with a common glass electric-machine. Many bodies develop it when rubbed—for instance, perfectly dry pebbles, the fur of a cat, silk, etc. The "odic" force of Reichenbach is an illusion, it has no existence; all his experiments are delusions.

R. S., OF N. Y.—"Is it not possible to make aluminum alloys, or aluminum bronze, by using some compound of aluminum without having the metal itself?" *Answer.*—Certainly; if, for instance, you expose to a high temperature 1 equivalent of chloride of aluminum, 5 of copper, and 1 of lime, you obtain an alloy of 1 equivalent of aluminum, with 5 of copper, and 1 of chloride of lime as a flux. Reducing this to weights, it approximates to 50 of chloride of aluminum, 160 of copper, and 28 of lime, giving an alloy of 160 parts copper and 14 aluminum; or approximately, 5 pounds of chloride of aluminum, 16 of copper, and 3 of lime, will give an aluminum bronze containing 3 per cent aluminum.

R. AND B., OF PA.—Your suggestions about coating an iron tank for water do not amount to much. You say good white lead will do very well indeed after the taste has disappeared; but we object to lead in any form for such purposes, because, when in the course of time the oil has dried away, the pulverulent white lead will, as is well known, easily rub off. If you do not object to the taste of oil-paint, why not use oil and oxide of iron? This becomes much harder than white-lead, and is not poisonous. Then you say, in reference to soluble glass, you "have not seen it applied, and cannot tell whether it will adhere strongly or be liable to scale off." If good, you think it will work well and be durable. Of course, "if good," but the trouble is, it is not good. We have seen it applied, and what we saw was not at all efficacious.

MINING SUMMARY.

California.

THE CERRO GORDO MINES.

THE Los Angeles *News*, July 6th, reports mining affairs in this hitherto neglected locality as being in a flourishing condition. It says: "William Eakin and Jesse Avers arrived in this city last Saturday from Cerro Gordo, Mr. Eakin bringing ninety-six bars of metal, weighing four tons, and the latter bringing sixty-six bars, weighing three tons. This metal is richer than any heretofore brought to our city, as the regulus is more concentrated. New mines are being located every day. Four new furnaces are in course of construction and nearly completed. The St. Ignatius mine was recently sold for $24,000 cash."

THE ALPINE COUNTY MINES—INTERESTING REVELATIONS.

A CORRESPONDENT of the San Francisco *Herald* contributes the following information in regard to some of the prominent mining enterprises of this district of California:

BULLIONA

"Is the name of a new post-office just established at the place formerly known as Mt. Bullion. This is at the junction of Monitor Creek and East Carson River, where the Monitor road intersects the Carson Valley and Silver Mountain toll-road. It is centrally located in the mining region of Alpine County. Here, too, are the headquarters of two of the most important mining enterprises in the eastern portion of the State. The first in importance, as having a direct and positive influence on the destiny of the county, is that of the

IMPERIAL SILVER QUARRIES' COMPANY,

whose property consists of a tunnel location, designed to cut a belt of upward of twenty parallel ledges, lying between Bulliona and the town of Monitor. This is a London corporation, formed of first-class business men and capitalists, and whose chairman is the 'Right Honorable the Earl Poulett,' a nobleman of immense wealth. The resident director and manager of the mine is Mr. Lewis Chalmers, a Scotch gentleman, possessing all the necessary qualifications for a successful mining superintendent. When Mr. Chalmers arrived here—in the month of November, 1867—he found that his Company had no title to the property, and that the representations made to his Company by Captain Jones, the party negotiating with them for the sale of the property, as to its condition, were nearly or quite all false; and so perfectly disgusted did he become upon finding out the true state of the case that he was upon the verge of giving the whole thing up and returning to England. After carefully examining the property, and satisfying himself of its value, he set himself to work to get a perfect title, which, after a delay of nearly three months, was accomplished. He commenced work in his tunnel, which was then a distance of about 180 feet, some time in February, 1868, since which time he has made upward of 700 feet of large double-track tunnel, six feet wide by seven feet high in the clear. Much credit is due to Mr. Chalmers for the able manner in which he has succeeded in bringing order out of chaos, and in quieting title to the property, and the efficient manner that he has managed the general business of the Company. Not a day has he been absent from his post, and not one dollar has been uselessly spent for show. Unlike the Great English Company, that spent over half a million of dollars in the construction of magnificent works on the Truckee, near Reno, before they knew whether they had any ore or not—and which has been standing still as a monument of folly and stupidity ever since—the manager of the Imperial Company goes upon the principle of getting his ore, and then building his mill, adapting it to do peculiar methods of treatment that shall be found best calculated for the successful extraction of the precious metals. Had all managers for foreign capitalists adopted the same wise course, what a different record would have been made for California and Nevada! Millions of dollars of Eastern and European capital have been swallowed up in the construction of useless works before the exploration of the mines of the companies were even superficially attempted, and when the mills were ready to be put in operation there was no ore for them to work; so every thing had to come to a dead stop until the mines could be open, which, in too many cases, has never yet been done. This feature of mining mismanagement has done more to damn this important industry of the Pacific Coast than all the other calamities to which the business is subject. Next in importance to the Imperial is that of the

MOUNT BULLION MINING COMPANY,

whose property is on the west side of the river, and about three hundred yards below the Imperial. This is likewise an English enterprise, but entirely of a private nature. The superintendent is a Mr. Joseph H. Coulter, an old and experienced California and Arizona miner. This property consists of a series of four parallel ledges of great promise, the first of which will be cut within about 200 feet. The tunnel of this Company will cut the back ledge of the series at a depth of 1000 feet, while the Imperial will cut three of its belt at a depth of not less than 1500 feet. Mr. Coulter built for his Company, last fall, a good dam across the river at this place, from which he will take the water in a flume to just below the mouth of their tunnel, where their mill will be built. Another English enterprise in this vicinity is the

ALPINE GOLD AND SILVER COMPANY,

whose Superintendent is Mr. F. A. S. Jones. The property of this Company consists of six parallel ledges in Alpine District, and three in Monitor District, with a mill-site on the river. Their principal ledge in Monitor District, known as the 'Indian Chief,' was supposed to be on the same deposit as the great Tarshish ore-bed, but developments in the tunnel of the Tarshish Company have proved the fallacy of that supposition; therefore the Alpine Gold and Silver Company have nothing to hope for from that source. This Company have issued a circular prospectus in London, soliciting subscriptions to the stock of the Company, from which we make the following extract:

"'By last advices, January 7th, the first lode had been struck in the Indian Chief tunnel, at 100 feet from the mouth of the tunnel, and they had gone thirty feet in the lode, and are not through it. A sample of the ore has been received, which has been assayed by Mr. Rickard, and found to give 718 ounces of silver to the ton of ore, value one hundred and seventy pounds sterling per ton. The ores are for the most part soft and easily reduced, and the facilities for working are so great, that the mining and reducing will not probably exceed, at the outside, $7.50 per ton. The Pacific and Atlantic Union Railway, which is to be opened this year, will give access to New-York direct on the one hand, and San Francisco on the other. A branch line—now in the course of construction—will bring this railway within sixteen miles of Monitor.'

"A copy of the prospectus of the Company, from which the above is a faithful extract, was forwarded to a resident of this place, requesting to know if the statements contained therein were true; and I have been allowed to read it, and to make such reply through the columns of the *Herald* as will fully answer the facts of the case. The truth of the matter is, that the above is a gross fabrication, without the slightest foundation for a basis. There never has been a ledge (other than of bed-rock) of any size whatever struck in the Indian Chief tunnel, and consequently there could not have been any ore of any description struck, and much less of the enormous richness of upward of $900 per ton. If ore has been forwarded to the Company in London by the Superintendent, such ore must have been borrowed from some neighboring mine, and the statement of the ledge manufactured for the occasion; for not one pound has been yielded by the property, and it is highly questionable if any can come from so barren a looking outcrop as that of the Indian Chief.

"As to the railway, the nearest point to which it approaches Monitor is at Reno, a distance of seventy-five miles by the only road reaching that place. There can be but one conclusion arrived at in connection with this prospectus, and that is, that the parties organizing the company have reared a gigantic 'wild cat,' of the most hideous description, for the purpose of gulling an always over-credulous public. For the sake of the good reputation of Alpine County, and the many promising mines now under process of development, it is to be hoped that not one share of the stock of this Company has been or can be sold on the false statements put forth in this *public* prospectus of the Alpine Gold and Silver Company. A duty that the press of California owes the community at large is to expose all such false statements whenever and wherever they appear, otherwise all foreign capital will be withheld from assisting in the development of our great mineral wealth. It is reported that the Superintendent of this Company telegraphed to London last fall that we had struck a ledge in the Scottish Chief tunnel (which is being run for the ledges of the Company, located in Alpine District) that paid $130 per ton. Upon the strength of this telegram, letters of inquiry were written by parties in London to residents of this place, to know if such was the case. An examination of the tunnel was made, and it was found that there was no ledge developed, and, furthermore, that a *long* distance would have to be run before one could be expected. Such management as this is sufficient to damn any enterprise or country, and Alpine County is a forcible illustration of the evil. Nothing but the redeeming influences of such management as that of the Imperial and Mount Bullion Companies can ever take off the curse, in London, of such statements as put forth in the prospectus above noticed.

THE TARSHISH MINE,

which is owned by a New-York company, and whose managing director at the mine is a Mr. Schwerin, is about to be started up. The only cause of delay now is to hear from Mr. Graff, former Superintendent, who is in Mexico, to know if he will come up and resume control of the mine. If Mr. Graff responds in person to the inquiry, work will be immediately resumed; if he cannot come, then Virginia will be drawn upon for a competent man for the situation. This is a valuable property, which has heretofore yielded considerable returns, but which, owing to disaffection in the Company in New-York, has been idle for over a year.

THE MORNING STAR,

of Mogul, under the management of J. Y. Gamble, is steadily at work, with good results. It is reported that they have developed a body of ore in their lower level that is of an entirely new character, being much less refractory than that heretofore found. The working of the ore from this mine by the leaching process, at the Pioneer Mill at Markleeville, was a failure, and the result has been that no attempts have been made since December last to work any of it. This is one of the most refractory ores known, and there is probably no process outside of smelting that will successfully treat it.

THE MONITOR CONSOLIDATED COMPANY'S MILL,

situated on the river three quarters of a mile below Bulliona, is so far completed that a trial of the machinery will be made in a few days to demonstrate the practicability of the Boston machinery for crushing and pulverizing ore. This machinery consists of a rotary crusher, which breaks the ore into sizes which will readily pass through a half-inch screen, while the pulverizer consists of a cast-iron drum, fitted with beaters, on the same principle of the fans of a fanning-mill for winnowing grain. The crushed ore as it comes from the rock-breaker is slowly fed into this pulverizer, where it is kept in constant motion by the beaters, which revolve at the rate of 1000 revolutions per minute, until it is reduced to such condition that it is carried out of the pulverizer by a current of air that passes through the machine for the purpose of removing the pulverized ore. If this pulverizer comes up to the standard, as established by the inventors, it cannot fail in being of great service where dry crushing has to be resorted to. The Monitor mill is to run on Tarshish ore, and will be fitted up with the necessary machinery for amalgamating that particular kind of ore, let it be by wet amalgamation or by the dry process introduced by Messrs. Paul & Wood. Investigations are now being made with a view to settle that question before ordering amalgamating machinery.

"The mill is driven by an improved turbine wheel of 150 horse-power. The water is conducted to the mill, a distance of about 100 rods, in a flume, which gives them a perpendicular fall, through the pen-stock supplying the wheel, of twenty-six feet. With this head of water, the wheel can easily be kept at a capacity of not less than 150 horse-power; and then there will be a surplus of water in the river running to waste, equal to that consumed by the mill. The Superintendent of this Company is Mr. S. G. Lewis, who is also the editor and proprietor of the *Alpine Miner*, a weekly newspaper devoted to the mining interests of the county."

Nevada.

THE COMSTOCK, WHITE PINE, AND COPE MINES.

A CORRESPONDENT of the New-York *Tribune*, writing from Dayton, Nevada, July 15th, says:

"Work has again been resumed in portions of three mines, in which the terrible fires occurred on April 8th, and in which nearly forty persons lost their lives. They were the most important mines on the Comstock lead, and the long suspension of operations was followed by a prostration of all kinds of business, equal to that during the financial mining panics of 1864–5. Small quantities of ore have been removed from the upper levels of the mines during the last two weeks, the lower drifts having been carefully closed in order, if possible, to smother the fire known to be still raging below. Last Saturday, some of the levels in the Yellow Jacket were opened, with the expectation that the fire had been extinguished, but the draught of air rushing up from below was so heavily charged with smoke and suffocating gases, that they were closed again immediately, and there is now a strong probability of their remaining so for months, until the whole immense mass of timbering with which the drifts are supported is reduced to charcoal. What will then result is difficult to tell. Several of the mines, even when strongly timbered, have caved in, and in one or two instances, from the surface, swallowing up dwellings and giving the inmates some idea of an earthquake on a small scale. Should this be the result in this case, as is by no means improbable, the Yellow Jacket, Crown Point, and Kentuck mines, whose stock stood at the head of the board previous to this calamity, will be destroyed. That the Comstock is not inexhaustible is a conviction that is now forcing itself upon the most enthusiastic of her advocates. The three mines that formerly and at different periods held regal sway over all the others, employing hundreds of men, bringing up immense masses of treasure, and returning princely dividends when their sister mines upon the same lead were struggling with few men and scanty means to strike the pay ore, have all now been literally worked out, and the three largest mills in the State, each capable of crushing more than 100 tons per day, belonging to the Ophir, the Mexican, and the Gould & Curry, are stopped, probably forever. Preparations are now being made, however, to convert the Mexican mill into a repair shop for the Virginia and Truckel Railroad. These ominous forebodings are rendered still darker by the depreciation of the ore all along the lead, as the mines are sunk deeper. So material has been this depreciation that the extraordinary improvements made in working the ore, and the great reduction of expenses secured by cutting down the salaries and reducing the number of presidents, directors, trustees, etc., etc., that were formerly supposed to be necessary to successfully carry on a mine, has only been able to keep them in existence, and even now an occasional assessment is found necessary to avoid running into debt. So universal is this fact that there is not a mine upon the lead whose assessments taken from the beginning have not balanced the dividends. Much of this, it is true, was in the early day due to the reckless extravagance with which the paying mines were conducted, when the magnates of the stock board lived in princely elegance, and lavished thousands upon ornamental engines, and palatial mills and hoisting-works; when the working superintendent at the mine received $15,000 a year, and a score of officers who never left San Francisco was each the happy recipient of even more than that. Those were the palmy days when the Washoe and the Gould & Curry stood at $5000 per foot. But they are not likely to return, and by the present economical methods employed in working the ore, rock that pays $50 per ton leaves as large a net margin as $100 rock did in those days.

"Treasure Hill, and its immediate vicinity, with the exception of the Base Metal range, has ceased to be the excitement in south-eastern Nevada, and outside districts, within a radius of 100 miles, are now being thoroughly prospected. The incomparable Eberhardt still stands without a peer, but many experienced prospecters are of the opinion that the Base Range will furnish the most extensive and trustworthy sources of wealth. The last sensation is the discovery near Duckwater, 35 miles south of Treasure City, where average samples of argentiferous rock, free from other metals, assay as high as $100 per ton. Cope district, in Elko County, near the Idaho line, is attracting much attention, the rock there assaying as high at $700 per ton, and as the district is abundantly supplied with wood and water, there are superior advantages for the cheap reduction of the ore. A large lode of magnetic iron, or loadstone, exists in this district, and draws down upon it the lightnings of every thunder-storm. The surface of the ledge lies in waves of solidified slag, blackened and glazed like the cinders of a blacksmith's forge, doubtless from the effects of lightning, which for ages has made this spot its target. At Treasure Hill a singular deposit has been brought to light by the sinking of a shaft in the Hidden Treasure Mine. At the depth of 12 feet the shaft penetrates a cavity in the hard rock filled with a decomposed mass of quartz, worth about $5 per pound. The opening is about four feet wide, and runs toward northwest to an unknown distance. A drift has been started along the northern side of the deposit for the purpose of following it up, and at the same time keeping one side of the drift on a solid foundation to guard against accidents."

"Every day brings in 'refugees' from the new mines. For the most part, they are the veteran, irrepressible, indefatigable, unreclaimable Californian prospecters—a genus peculiar to the mines, and knowing no existence outside of the auriferous argentiferous belt. These same worthies, who now come riding into town from White Pine on very little mustangs and deep Spanish tree-saddles, have, beyond a doubt, followed every excitement since '49,' without once finding a 'good thing,' or leaving a mining-camp before they had pronounced it the greatest 'bilk' of the age. Let them be in never so reduced circumstances, a proposal to go to work is rejected with indignation, as they congregate around the saloons, giving profound elucidations to all the knotty mining problems extant, or eloquently lamenting the halcyon days of the surface-diggings. Now and then comes among them a long-haired, 'hard-sided' desperado from the far interior, perhaps a fugitive from Judge Lynch in Cheyenne or Summit City. These last have a liberality of ideas that is very refreshing even in this not over-fastidious community, and a Colt's dragoon at their girdle is the umpire to whom they refer all disputed points. A striking illustration of some of their peculiarities was furnished me at a little social gathering a short time ago. Some of the friends of Lieutenant-Governor Slingerland related the following incident, and on my inquiry it was modestly corroborated by the worthy Governor himself, who was present, though he has since gone East: Soon after the completion of the Pacific Railroad, the Governor and some of his friends took a trip over the road, and, stopping for breakfast at Cisco, the Governor found himself at the table *vis-a-vis* with a 'Cheyenne rough.' The mountain air having created a keen appetite, he ordered a porterhouse-steak. Having applied a plentiful amount of butter, salt, pepper, etc., he prepared to test its gastronomic qualities. Meanwhile the rough had been watching the Governor's proceeding with an interest wholly unaccountable, and to the neglect of his own wants, until he saw him

ready to enjoy the savory bit before him, when, coolly reaching across the table, he transferred it to his own plate. The Governor is a large man, with an arm like Hercules, but the rough was perhaps a match for him physically, and carried a revolver in his belt. Astonished as he was at this audacity, the Governor did not lose his presence of mind, but raising a cup of hot coffee, dashed it full in the face of the insulter. Blinded and scalded by its contents, the rough sprang to his feet, at the same time drawing a navy-pistol from his belt, but the heavy earthen coffee-cup following its contents, struck him in the temple, and he fell backward over his seat, and before the desperado could recover, a dozen men were holding him down, while the friends of the Governor hurried him out into the cars, and the train moved on. Not a word was spoken by either during this rencontre, and it is not probable that the desperado knew at the time who he had attempted to use as his caterer."

OPENING OF THE ROCKY MOUNTAIN COAL TRADE.

WE copy the following from the Elko *Independent* of July 13th: "The first consignment of coal from the Rocky Mountains arrived in town this week. It consisted of three car-loads from the extensive beds in the Bitter Creek County, east of Green River. The owner, M. S. Hall, is here for the purpose of introducing his coal, which he claims equals in quality that of the best Pennsylvania mines, and the quantity he claims to be practically inexhaustible. The mine is within a short distance of the Union Pacific Railroad, from which a side track extends to the works, and is distant from Elko about 475 miles. Mr. Hall supplies the city of Omaha, 800 miles from the mine, with coal at the rate of $20, coin, per ton, and as soon as proper arrangements can be made for transportation, intends to supply the market here at $30 per ton. If the mines which are now being prospected in our immediate vicinity should not prove extensive, we hope that a liberal policy on the part of the railroad companies will enable Mr. Hall to supply our young city with coal at a slight advance on Omaha prices."

DISTURBANCES AMONG THE MINERS.

A TELEGRAM from San Francisco, July 28th, says: "The members of the Miners' Union in Treasure City, Nev., yesterday visited the principal mines of the White Pine district and compelled the men who were working for less than five dollars a day to stop labor, using violence in some cases. Even those laboring under contract were compelled to desist, and no one allowed to work."

Colorado.

KROM'S METHOD OF DRY-ORE CONCENTRATION.

PRACTICAL tests of the merits of Krom's concentrators have recently been made by one of the prominent Colorado companies, with very fine results. We find in the Georgetown *Miner* the following interesting account, which should command the attention of all engaged in mining pursuits:

"It is an acknowledged fact that in order to give to our ores, especially those of a low grade, sufficient value to render their handling and milling profitable, we must have some mode of concentrating that will prove cheap and reliable, and that will work the ores without serious loss. It is well known that in the crushing of ores carrying sulphurets of silver, as well as those containing ruby and brittle silver, those precious minerals are reduced to an impalpable powder, which, by the common mode of wet concentration, passes off in the slime, often floating off on the surface of the water. It may be, and we earnestly hope that such is the case, that the works now in process of erection by the Wilson & Cass Company, under the immediate supervision of Professor Kurtz, with the improved machinery being erected, will save this rich material. But yet we firmly believe, from the evidence we have seen both here and in the East, that the Krom Dry-Ore Concentrator is the best and most practicable machine yet introduced and successfully worked. Its cheapness, capacity, simplicity, and limited amount of power required to operate it, and the effectiveness with which it does its work, force us to the conclusion, and we have been of the same opinion for the past two years, that these machines will render available all the low-grade ores of this and adjacent districts.

"It gives us pleasure to announce that the Washington Mining Association, of New-York, George Stille, Superintendent here, are now putting in their mill three of these concentrators for custom-work. H. S. Jacobs, Esq., of New-York, one of the Directors of this company, who has had a large experience in the working of these machines, has recently arrived here, and is superintending the rearranging of the mill and the setting up of the machinery, and will attend to the running of the works. He brought with him a small concentrator, with which he has made some tests that have given perfect satisfaction.

"The first test was from a small lot of second-class Terrible ore, that gave an average assay, before concentrating, of $110.55, coin value. The concentrated ore gave a result of $296.74, coin, and the tailings, $17.12. The loss is about three per cent.

"The second test was from sulphuret and ruby ore, from Dailey district. Average assay, before concentrating, $82, coin. The concentrated ore assays $800.40, coin, and the tailings, $21.30. This test we do not consider a fair one, for two reasons: First, there was not enough of the ore to work the machine properly; and, second, the ore was not graded as it should have been. We are of the opinion, however, that sufficient was done to demonstrate its success on our ores.

"While East, we saw galena and zinc blende ores worked by this concentrator, by which the two minerals had been thoroughly separated. We know of nothing that will do more to bring our low-grade ores into a productive state than the works that are now being erected for their concentration. When this mill is finished and in operation, we will give a full description of it, together with the results obtained from time to time."

[We called the attention of the public to this concentrator nearly a year ago, and commended it warmly, as we then believed, and as we now believe, on just grounds. We are glad to learn that its merits are gradually becoming known, and that there is an inclination, on the part of the mining public, to give it an opportunity to succeed.—ED.]

DESTRUCTIVE FIRE.

A CORRESPONDENT, writing from Georgetown, says: "The fire started at or in the vicinity of Messrs. Gunn & Co.'s saw-mill, six miles above Georgetown, on the west fork of Clear Creek. The wind was blowing a perfect gale at the time. The flames swept down through the valley, burning all the dry timber as it moved, and the green timber in patches. All the miners' cabins, with their contents (in many instances every thing they had), were destroyed. There were probably a dozen or more of them strung along the creek in a distance of three miles, extending from Brownville to Gunn's saw-mill. The fire spread so suddenly, leaping from one side of the valley to the other, and advanced with such fearful rapidity as to force men to take to the mountain-sides as a means of escape. All the buildings belonging to the American Tunnel Company were destroyed, together with two thousand cords of wood. The Brown Company's buildings were in imminent danger all the afternoon, and it was only through the untiring and determined energy of the men at the furnace, assisted by about twenty of the miners from the Brown and United States Coin Lodes, that these works were saved. Mr. Watson turned the water from Brown Gulch, so as to wet the buildings constantly. McDowell & Co. lost twelve hundred cords of wood, which they had ready to deliver to the Brown Company. Messrs. Crow & Clark fought fire all the afternoon at their tunnel, and saved their buildings. They lost fifty cords of wood, and the men who are cutting wood for them lost one hundred cords. The Burleigh Tunnel Company fought fire about their buildings and kept it off, but lost about fifty cords of wood. Three thousand four hundred cords of wood were destroyed by this fire. The Brown Company has about a three days' supply on hand, and when that is gone they will be compelled to stop smelting until a supply of dry wood can be got.

"An extensive and destructive fire, between North Empire and the Snowy Range, is reported to have destroyed the buildings and machinery of the Conqueror, Rosecrans, and Atlantic lodes, besides a large and valuable body of timber."

A VEIN OF SOLID SILVER.

COLORADO papers have contained, for several weeks past, accounts of the discovery, in the Coaly and Gilpin County Mine, of a vein yielding chunks of native silver. Says the Central City *Herald*, July 16th:

"This is the most remarkable deposit of native silver we have ever heard of. The ore-vein is now two and a half feet wide, and the vein of native silver is, in places, an inch and a half thick. An inch and a half of silver is not very much, but when miners keep digging it out for six weeks, and it still holds out, it begins to be worth talking about. The mine has recently been visited by gentlemen from all parts of the country, and every one who has seen it pronounces it the richest mine he ever heard of."

The same paper, under date of July 14th, reporting a visit to the mine, says:

"The shaft from which the native silver comes is on the Coaly vein proper, and was commenced six weeks ago. The vein dips to the north, toward the Gilpin County vein, and the miners think it will finally unite with it, though it now, at a depth of twenty odd feet, seems to be straightening up, to use the miners' expression. The force employed on this shaft was two men for the first two weeks, and from six to eight the rest of the time. These men are sinking and stoping out, and have, in this time, taken out twenty-four tons of selected ore. Fourteen tons were sold to Professor Hill for $325 per ton. The ten tons now stored at the mine is of a better quality than that sold, and is worth a great deal more money."

THE BALTIMORE AND COLORADO TUNNEL.

THE Georgetown *Miner*, July 15th, speaking of the progress of this enterprise, says:

"The tunnel is being driven rapidly by hand, and Burleigh tunnelling-machinery is now on the way here, with which it will be run. The advance already made is 125 feet, the depth from the surface being 76 feet. The next 10 feet of advance will increase the depth 40 feet. One vein has been crossed, of which we have previously made note, which is full 17 feet in width, principally decomposed talc, carrying some galena and zinc blende. Assays from this vein range from five to fifty-two ounces of silver to the ton of ore. A contract has been let to run a drift 50 feet east on this vein, and we are of the opinion that within a few feet fair milling ore will be found.

"The tunnel will cut another vein 10 or 15 feet in advance. A fair vein of mineral is cropping out in the solid rock on the surface. In about 75 feet, the Yankee lode, supposed to be the west extension of the Terrible, will be cut.

"The fact that this tunnel will cut the Terrible, Brown, Coin, Lily, and many other noted veins, on the company's own property, gives to it a prestige, together with a certainty of success, not enjoyed by many companies in the Territory."

Indiana.

IMPORTANT DISCOVERIES OF COAL AND IRON.

THE Columbus (Ohio) *State Journal* says:

"Dr. Edward T. Cox, State Geologist, returned on Saturday night from an expedition to the western part of the State, where he has been engaged for nearly three weeks in the prosecution of his official labors. This time has been spent in Clay, Owen, Vigo, and Parke counties, and the discoveries made have been of a highly important character. He has succeeded in tracing the belt of block coal through those counties, beginning in the southwestern part of Owen county and extending in a direction rather west of north through Clay, Vigo, and Parke counties. The belt is about six miles in width, Brazil and Rockville being on the western margin of the belt. Throughout this distance this coal is found in good beds, ranging from three to five feet in thickness. On his next trip, he expects to trace the same belt through Fountain and Warren counties. All of this is very accessible, and much of it can be readily reached by 'drifts' into the hillside.

"Near the middle of Clay county a fine deposit of bog-iron ore was found in quantities sufficient to run a furnace, and in most of the ravines through the district there are large quantities of kidney ore, in no place sufficient to support a furnace, but all of which can be made available. He also came across a considerable amount of banded ore—a carbonate of iron—in Parke county. He has not yet tested its quality so as to be satisfied as to its richness, but is rather inclined to the opinion that it may contain iron enough to justify its being used as an ore. These iron deposits he expects to trace into Greene county, and his next trip, after investigating the coal measure of Fountain and Warren counties, will be extended to the neighborhood of Bloomfield, Greene Co., for that purpose.

"Besides the block coal, which is so valuable on account of its being available for smelting-iron without caking, beds of bituminous caking coals were found throughout the section, in veins ranging from five to eight feet in thickness, which will make excellent fuel. The difference between this and the block coal is, that the latter does not melt and run, but keeps its original shape under intense heat, thereby making it possible to keep up a strong draught through it, which cannot be done with the caking coal. The latter has its value, however, for fuel, and is very accessible by means of drifts or shallow shafts.

"Dr. Cox is satisfied that there is a very bright future in store for Indiana as a manufacturing State; that it will not be long until the entire western portion of the State will be covered over with furnaces, and that we shall stand second to Pennsylvania only in manufactures. The value of this block coal, which is being found in such large quantities, can scarcely be over-estimated, as it must so very greatly lessen the cost of manufacturing iron. The only other place where it is found is in the Chenango Valley in Pennsylvania, and there only in limited quantities. The people throughout the section of the State he visited are wild with excitement, and take great interest in the investigations which are being made. Such being the case, the doctor found every body ready to lend him all the assistance he could desire. Eastern capitalists are also becoming more and more interested. They are pursuing their investigations quietly, but none the less actively, and some of our own men may wake up to the importance of this enterprise, to find that Eastern men are already ahead of them. He found some men engaged in prospecting for a railroad to run directly through this region, and they were anxious to secure the aid of Dr. Cox; but he told them he would locate the coal-beds, and they might locate the railroad.

"Fine specimens of freestone, of excellent quality for building purposes, were found throughout the section surveyed.

"Dr. Cox brought home with him two boxes filled with specimens of the coals and ores found, which he will proceed at once to thoroughly test. After a week spent in this way he will start upon his next trip."

New-York.

NOTES ON IRON MANUFACTURE.

THE Philadelphia *Exchange and Review* has the following: "In a former number we gave an analysis of the Shurtliff ore and some notice of the Sterling, N. Y., ores, and promised to speak of the method of working the charges. We have lately received information from Mr. Sterling, the proprietor of the mines and furnace. We have also an instance of a remarkable yield of iron for the amount of coal used, the facts in relation to which we received on a visit to Rochester, from Mr. Horton. Both of these items will be interesting to our readers:

"In the practice by Mr. Sterling, care is taken even with the kind of charcoal. He uses generally two thirds hard wood (beech and maple) and one third hemlock and spruce. A charge consists of 20 bushels charcoal, 550 pounds usual ore (with all hard coal 625 pounds), 50 pounds lime. The Shurtliff ore is used as a flux, usually one eighth. Iron from the Sterling ore commands a higher price than that from the Shurtliff or Rossie ores. The furnace for the Sterling ore is small, hence the charges are small. Size, 32 feet high, 24 inches diameter of bottom of the hearth, 26 inches across tuyere, 9 feet across the bosh, only one 3-inch tuyere; cold blast, and about one and a half pounds pressure. The ore works easily.

"At Rochester Iron-Works, N. Y., Mr. Horton has succeeded in making a large yield of a strong and tough iron, which we have had the opportunity of testing in the pig, but only from one cast. His practice is to make neither coal nor blast constant, but to vary the three elements, coal, temperature, and pressure, to suit the conditions of his furnace. His ores have been Lake Superior red hematite, a great proportion of which was micaceous red hematite and the fossil ores, also red hematite, of New-York. In mixing these ores one half to one half, or three fourths Lake Superior to one fourth Oneida County fossil (of the kind described as Fish Egg ore), a very superior iron for foundry purposes has resulted. These works use Luzerne County anthracite—high temperature of hot blast (about 1000° Fahr.) and pressure moderate.

"Mr. Horton's report for March, 1869, was:

	Tons.	Cwt.	Qrs.	Lbs.				
Coal used,..	1341	10	1	12 — 29½	cwt.	to	ton of	iron made.
Ore,.....	1867	4	3	13 — 14½	"	"	"	
Limestone,.. ...	602	18	2	3 — 13½	"	"	"	

Iron made, 902¼ tons.

"Charges, four barrows coal of 500 pounds each; four barrows ore, 675 to 700 pounds; two barrows limestone, 445 to 462 pounds, as the case may require.

"This is certainly the most remarkable instance with which we are as yet acquainted, as it will be seen that a furnace of only fourteen feet bosh, fifty feet high, casting on the average 29.1 tons per day of an excellent foundry-iron, with the use of only 29¼ cwt. to the ton of iron made, being not quite 1¼ tons of coal to the ton of iron made."

Idaho.

WAR EAGLE MINES.

A RECENT Silver City *Avalanche* has the following notes on these mines:

"The main shaft of the Ida Ellmore is now down 250 feet. The vein at this point is about 3½ feet wide, containing ore of as rich quality as has ever been extracted from this famous mine. There is a level of 140 feet opened ready for stoping, which will enable the mine to produce from 25 to 30 tons per day for some time. There is quite a pile of ore laying at the hoisting works.

"The principal shaft of the Golden Chariot has attained a depth of 280 feet, and the ledge at its bottom presents a better appearance than at any time in the history of the mine, averaging from 2 to 3 feet in width, composed of very rich ore. A third level has been formed at a depth of 240 feet. There are in the neighborhood of 400 tons of quartz in the ore-house ready for hauling.

"The main shaft of the Silver Cord is 132 feet deep, and the ledge, which has been gradually increasing as the shaft progressed averages now 2½ to 3½ feet in width, and the ore, the quality of which has also increased in value as they have went down, remarkably so in the last 20 feet, is beyond question excellent. The large flow of water in the mine, which heretofore retarded work considerably, has been reduced one fifth by means of a large tank built on the 100-foot level. No further trouble from the water is apprehended."

Pennsylvania.

ANOTHER LARGE SLATE FACTORY.

THE Slatington *News* says: "The Lehigh Slate Company are putting up a new School-Slate Factory near the Washington Quarry, which, we learn, when completed, will be the largest school-slate factory in this State. It will be filled with new and improved machinery, and calculated to make all kinds of school-slates, many of them new and unique."

The Roads of New-York Central Park.

BY WILLIAM H. GRANT, SUPERINTENDING ENGINEER.

BEFORE describing the details of the drainage works pertaining specially to the roads of the Central Park, the following description of the connected and more extensive system of surface-drainage of the grounds will not be out of place.

* The larger drainage areas of the Park have, besides the principal basins and depressions into which the water descends, other subordinate depressions and irregularities of surface, of various extent, through which the drainage water must pass, and which would form pools in many cases during rains, if proper arrangements were not made for discharging the water. There are also districts of ground in which the natural watercourses have been unavoidably obstructed by the works of the Park, forming artificial basins, which would be liable to become ponds at times of excessive drainage, if ample outlets were not provided. Special attention has been given to all such cases, to prevent the lodgement of water. Under-drains of ample capacity have been laid, and the water admitted to them by inlets with grated covers, or, where practicable, natural depressions have been modified in extent, and the ground so shaped as to give them outlets on the surface. In some instances, to guard against contingencies, double outlets are made, one communicating with a separate drain from the other, or communicating with the same drain or sewer, at a different point, where the capacity is enlarged.

Experience has shown that it is not safe to rely upon mere agricultural drains, however perfect they may be, to absorb and carry off sudden accumulations of water from any considerable area of depressed ground. Such drains act by a slow process of percolation under the most favorable circumstances, and are liable to become entirely inoperative for surface-drainage at times when they are much needed; as, for instance, when the ground is temporarily and lightly frozen, or when it has been frozen to the greatest depth, and is gradually thawing out, the lowest portion of the frozen stratum remaining unaffected and impervious for a considerable length of time. At such times, standing water on the surface for a longer or shorter period must result from a thaw of snow or from rain, and if no other drainage ensues, lawn grass and shrubbery that might be submerged would be likely to receive serious injury. The surface and under-drains for the grounds at large, connect with the road-drains, and together make up a common system. Besides the drains here alluded to, that lie below the surface, other drains, water-channels, paved gutters, and catch-water drains, or "sod-gutters," lying upon the surface, form a part of the system. Where drainage water is brought to the roads from adjacent higher ground, it is generally intercepted by sod-gutters in the manner hereafter described. The drainage of the roads is received into the under-drains below, through strongly grated inlets in the road-gutters, as seen in the Telford and gravel road illustrations. The wider roads have under-drains to each gutter; the narrower roads have but one under-drain. In the latter case, branch-drains crossing the road connect the gutter inlets that are on the side of the road opposite to the main-drains, with these drains. The inlets are placed from two hundred to five hundred and fifty feet apart (generally two hundred to three hundred feet apart), and are in all cases constructed with silt basins at the bottom, to catch and retain any substances that would otherwise be carried into the drains. The road-drains and adjoining sod-gutters discharge, at various convenient points, into larger under-drains or sewers, and thence the water is conducted to the ponds or to the drainage outlets of the Park.

The road-drains are variously composed of stone or earthenware, vitrified and glazed pipes, cement pipes, and brick sewers. The vitrified glazed pipes have been the most extensively used. Cement pipes were introduced upon the Park after the work had been considerably advanced; they are of quite recent manufacture in this country, and were recommended by their cheapness as compared with the earthen pipe. They are made of hydraulic cement, and sand and gravel, intermixed in the form of a mortar, and are moulded with accuracy, and are submitted to pressure during the process, by means of machinery. When thoroughly made of the best materials, they possess the necessary strength and other qualities required for drain pipe. They cannot be safely used, however, without being first subjected to such tests as will prove the indurating and hydraulic properties of the cement, which latter material is the important ingredient in their composition. They are not quite as perfect in their operation in conveying and discharging water as the earthen *glazed* pipes, as the latter pipes, from the superior smoothness of their interiors, cause less friction and retardation of the water, but they are superior to brick sewers in this respect.

In the use of the earthen pipes, they were found to be cheaper than brick drains, for all the smaller sizes of twelve inches and under. The cement pipes, as compared with brick, are ordinarily cheaper than brick, up to sizes of about twenty-four inches, which are the largest that have been used on the Park. Previous to arranging and laying down these pipes along the roads, the areas of drainage-surface for the different widths of roads were computed, together with such exterior drainage as was immediately connected wirh the roads, and the sizes of the pipes were graduated to receive the accumulated water entering at successive points from the summit to the foot of each descent in the line of the roads, or to such points where the pipes, from the necessary increase of capacity, give place to larger sewers that conduct the drainage in various directions, to the Park ponds or to the drainage outlets of the Park. A specification of the manner of laying these drain-pipes will be given hereafter.

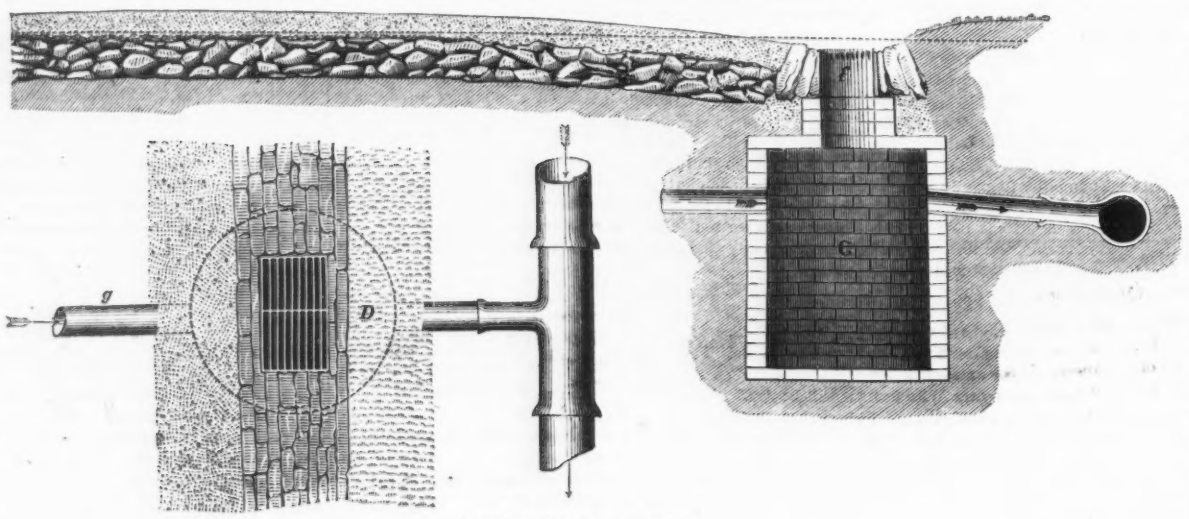
SILT-BASINS.

These basins, as before stated, are constructed in connection with the road-gutters, at distances of from two hundred feet to five hundred and fifty feet apart, along each gutter. They are shown in the cuts of the Telford and gravel roads, and are there designated by the letters A, B, C, and D. They are adapted in capacity to receiving and retaining such quantity of silt, mud, or road detritus as is likely, under ordinary circumstances, to be discharged into them during a heavy rain of the duration of twenty-four hours. They are very seldom filled in that space of time, and only hitherto in exceptional cases arising from the washing of newly-made slopes adjoining the road, or of gravel from the road, that had been freshly deposited and not rolled or compacted before the occurrence of a heavy shower. They will hold about a cart-load of silt below the level of the outlet or discharge-pipe. Their object is to prevent silt or other substances from being carried into the drain-pipes and obstructing their flow.* The bottom of the basins is generally five feet below the surface of the road-gutter, the outlet or connecting-pipe between the basin and main road drain being about three feet below the gutter. The connecting-pipe has usually a descent, before entering the main drain, of a few inches, to obviate any liability of the larger volume of water flowing through the main being diverted into the basin. Some of the basins first constructed were inserted directly in the line of the main drains, the latter entering and discharging in the basin on one side, and passing out on the other, as indicated in the Telford road illustration, given in a previous number. This method was considered objectionable on account of its checking the flow of water through the pipes, and also for the reason that the agitation of the water in the basin by the passing current tended to prevent the desired deposit of sediment. The preferable plan, of keeping the main pipes separate and a few feet distant from the basins, and connecting them by a branch pipe, has been generally adopted, as shown in the cut of the gravel-road† The mains follow, as nearly as practicable, the lines of the road-gutters, turning aside at the points where they pass the silt-basins, and occasionally diverging to the right or left, to avoid embedded boulders or projecting portions of rock.

The silt-basins are constructed of hard, thoroughly burnt brick laid closely and tightly in hydraulic mortar; the upper part above the level of the outlet pipe is covered over, except the aperture communicating with the gutter, with strong flags or flat stones. Upon this covering is built up the neck of the basin that supports the gutter grating. The grating is twelve and a half inches wide and twenty-four inches long, the bars being two inches deep, and is strongly made of cast iron, and fitted like a lid to a cast-iron curb or box that is supported by, and forms a part of, the neck or inlet of the basin.† The gutter-stones are joined up around the curb, the surface of the gutter coinciding with the top of the grating. The grating is easily lifted off and replaced in cleaning out the basin. A small scoop of sheet iron attached to the end of a pole ten to twelve feet long is used in removing the silt, which is first deposited in a heap on the road near the gutter, and when sufficiently dry is hauled away.

The accompanying engraving shows the appearance of this scoop. The basins are examined from time to time, and the directions are that they be cleaned out, in all cases, before the deposits accumulate to such an extent as to endanger their being carried into the drain-pipes. The water standing in the basins, usually up to the level of the outlet pipe, is protected, by the depth below the surface of the ground, the contracted aperture, and the grating covering the top, from freezing in winter, so as not to injure the masonry of the walls. The following remarks on the general drainage of the Park will not be without interest in closing this description of road-drainage.

* A recapitulation of all the works that have now been constructed for superficial and sub-drainage, and for supplying the Park with water, consisting of sewers, pipes, and tile-drains, and the iron and cement water-pipes, shows an aggregate linear extent of 398,764 feet, or 75½ miles. The completion of the several systems will make this aggregate about 110 miles. It is worthy of remark, that this extent of work, which performs so essential a part in the successful improvement of the Park and in developing its attractions, is wholly under ground and hidden from observation. The statement of the aggregate linear measurement, together with the brief descriptions that have been given of some of the leading parts, will suffice to give a general knowledge of the scope of the work and of the amount of labor involved: but it is only by a reference to the working maps and plans in detail, that an adequate idea can be formed of the entire arrangement, adaptation, and working of the respective systems.



THE GRAVEL-ROAD.

The large area of the Park, which is broken into undulations of all degrees, from precipitous to long, gentle slopes, receives the heaviest showers of summer, and the water, instead of accumulating in rushing streams and gullying the grounds, quietly and harmlessly disappears below the surface, and is gathered into the veins and arteries of the drainage systems, and passed off to supply the ponds, or is discharged from the Park in the same unperceived manner. When a shower has subsided, its inconvenient effects soon disappear, leaving undisturbed lawns, and the roads and walks comparatively dry and fit for immediate use. The Croton-water, at all points where it is desired, appears at command, or ascends in fountains at the appointed places; but the 110 miles of channels, and the various connected works through which all this is performed, are unseen, and show no evidence of the connection that exists between the effect and the cause.

The direct practical results alone are all that will arrest the attention of visitors or ordinary observers. Other works of the Park exhibit to the view their various purposes of utility and ornament, in more or less detail, and are accessible for inspection and repairs; but these spread out beneath the surface their extended reticulations, and perform their principal functions silently and unseen, and can be approached and examined only by indirect means. These facts give to this class of works a special interest, and show the necessity of special care and attention being given to works so situated, to maintain them in successful operation.

[To be continued.]

* From Report of Superintending Engineer of January 1st, 1862.

* They also serve a good purpose in partially relieving the drainage water of the roads from sediment and impurities before it reaches the filters and depositing basins that pass the drainage water into the Park-ponds.

† The gratings weigh eighty-eight and a half pounds: the curbs weigh ninety-three pounds each.

* From Report of January 1st, 1862.

Another Exploring Expedition.

A MILITARY expedition is about to be sent out to examine and map out that extensive region of country in Nevada lying between White Pine and the head of navigation on the Colorado. Able geologists, mineralogists, and botanists will accompany the expedition, whose reports upon their several specialties will doubtless furnish a large amount of valuable information. The region referred to is almost a *terra incognita*, although there is good reason to believe that its mineral value is fully equal to any of similar extent in the Great Basin. The geographical department especially, as well as the entire *personnel* of the expedition, will be under the immediate charge of eminent officers of the United States Engineer Corps.

THE ENGINEERING AND MINING JOURNAL.

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WESTERN & COMPANY,
Publishers and Proprietors,
37 PARK ROW,
P. O. Box 5969. New-York City.

New-York—A Mission Field for Engineering Enterprise.

IT must be a subject of profound astonishment to the reflective stranger who visits New-York City, to observe that while the inhabitants are at a stage of advancement far beyond the European standard, their streets and municipal arrangements exhibit a primitiveness that would hardly be found in a Prussian or English country town, or a French modern provincial city. He becomes querulous on the subject, and is assured with a reiteration that is tedious "that he is not to judge of American cities by New-York—that that would be altogether an error." He is further informed that the city is a prey to a corrupt municipal administration, that improvement is impossible under prevailing circumstances, etc. He is surprised at such statements; surprised to think that, notwithstanding the cosmopolitan character of the city, its inhabitants are so apathetic as to permit the continuance of a scandalous municipal administration! But his surprise is lessened when he discovers that other cities of the States present similar serious defects, though not on so exaggerated a scale as in New-York City.

The plan and situation of the city offer unusual advantages for sanitary arrangements of a superior character; with its superb avenues, the very monotony of whose perspectives is broken by lofty trees bearing luxuriant foliage. Apart from the beauty of trees planted in the streets, they are the best dust-intercepters known. Houses round which trees are planted in localities subject to dust, suffer far less inconvenience than without them. All such advantages appear to be unheeded.

The first inconvenience suffered by our stranger is one to his feet. He will not have traversed four blocks' length of footway ere his unhabituated toes will have encountered shocks indescribably numerous and painful, from the ridges and depressions in the footway, much of it having been laid only a few months before. New-Yorkers, like Dutchmen over the rough ice of their canal thoroughfares, possess some subtle involuntary habit of gliding over the numerous upheavals, etc., so that their prominence is not so painfully experienced as by the newly arrived. He discovers that ill-assorted and costly flagging is laid by clumsy masons, upon a bed of earth regardless of level, or plumbing, or of washing away. A little mortar is dabbed in the badly cut joint, and with a free use of the crow-bar, pick and rammer, the pavior is satisfied. The preceding week is a rainy one, and the newly laid pavement has the appearance of drift-ice, and drift-ice it remains, upheaved and depressed, to the serious inconvenience and retardation of the passing passenger traffic.

Paving-stones should be bedded in mortar and not in loose earth, in so primitive a manner. It is a short stride from the footway to the roadway; our stranger takes it, and discovers that the roadway is as badly laid as the footway, with the exception of the Nichols wood pavement, recently laid down in some thoroughfares, the efficiency of which time alone can prove. The roads in the by-streets and avenues of New-York are undoubtedly a disgrace to a modern city. Concession might be made to the bad paving of the street-car tracks, but not to that ill-paved condition that now exists, with the rails exposed above the surface, to the serious inconvenience of all traffic other than that of the cars. We have measured depressions and elevations of three inches, and the other day measured the depth of a depression in the middle of an important thoroughfare of over nine inches! The indirect cost of this to the community if calculated would be immense. The present Broadway roadway, recently relaid, exhibits a lamentable ignorance of the art of road-making; it is apparently laid with the intention of immediately being repaired. The subject of superior roadways, we are glad to know, is now under the consideration of the City Hall authorities, and various patterns, such as the "Stafford," and the "Nichols" wooden roadways, and the "asphaltum" road as laid in the Fifth avenue, and in some of the streets of Paris, are claiming their attention. We shall treat the subject of municipal roads, hereafter, critically and technically, and will, therefore, now pass on in our general summary to another evil which will undoubtedly surprise our stranger. He will observe that numerous thoroughfares are used by the inhabitants dwelling thereupon, as temporary storing places for their wagons, drays, etc.—some streets being literally blocked up by such obstructions. This means, the appropriation of the public highway for the benefit of private individuals. He (that is, the stranger) is informed that this privilege is an ancient one conferred by legislative enactment, and is silent.

The next subject of observation is a long vista—in some instances a perfect avenue—of unsightly barbers'-poles, trade-signs of every description, from "Bobdignagian" boots and tea-pots, extending downward in a constant ratio, according to the location. He is informed that a recent order has been issued abolishing these objectionable obstructions, many of them appropriating one half of the sidewalk, in a crowded thoroughfare, but that such an order has proved impotent as regards its execution. But even where these unsightly obstructions in the otherwise beautiful streets do not exist, the practice continues (discreditable to a modern city) of each householder depositing the daily-accumulated ash and refuse in receptacles varying, in size and character, from starch-boxes to flour-barrels, ranged along the pavement, instead of each one depositing the refuse, etc., in a properly covered dust-bin, attached to the house.

Now that we are upon the subject of street-obstructions, as an illustration of how the habit of suffering such public inconveniences occasions public indifference to them, it may be remarked that, during the recent road-paving operations of Broadway, notwithstanding the traffic had been diverted therefrom, one half of the valuable footway area was coolly appropriated by the contractors to pile their granite pitching upon, to the serious inconvenience of the crowded passenger traffic. If such a case had occurred in Paris or London, so great would have been the outcry, that had the authorities not ordered the removal of the "pitching," the inhabitants would have removed the unwarrantable obstruction themselves.

But although custom has made us indifferent, and we do not estimate our losses, still the loss of time, trade, etc., if calculated, would represent so startling a sum, that we would be surprised at our own shortsightedness in permitting such evils to continue. New-York is unprovided with public urinals and drinking-fountains; a few exceptions might be cited, but so few that their notice would be superfluous. A pretentious sanitary edifice has been four months in course of erection in Lafayette Place, but is not yet open for public convenience. That such a want should be permitted to continue is astounding! Perhaps on this point the Americans are fastidious. Be it so, the absence of such sanitary arrangements reflects seriously upon the cleanliness of the citizens. Drinking-fountains should be provided in all the eastern localities of the city; and that the more when our abundant supply of pure water is considered.

But we pass to another subject of sanitary reform that is sadly needed—to wit, the removal of sewage by night from citizens' houses, which is conducted in so primitive and disgusting a manner as to be beyond criticism. In Paris, where a separating system of drainage is in operation, and it is necessary to remove the sewage from dwellings, a suction-pipe of large diameter is applied; a force-pump being employed, the sewage is pumped into a closed portable iron receiver; all joints of hose, suction, etc., are surrounded by burning charcoal. Formerly, exhausted receivers were used, which, on being connected by an air-tight hose, instantaneously emptied the cesspool by atmospheric pressure. The wharving and docking of our splendid port is a disgrace, with its cumbrous, rickety spiling, grouped as if for picturesque effect, and not for economical service. Here is a great field for engineering improvement by the erection of convenient storehouses, so that when some improved system of railway communication is carried out, the delivery of shipping goods will be carried on with despatch and efficacy.

The illumination of the city is most indifferent, and calls for immediate reform. We call the reader's attention to remarks on gas-testing in our last issue as bearing upon this subject. The subject of superior railway communication we shall discuss in a future number. It is almost a work of supererogation to allude to the indifferent accommodation and public inconvenience of the present system of street-railways. We have thus cursorily glanced at some of the glaring evils of our municipal arrangements. We have said nothing new; our contemporaries have over and over again pointed out these scandals. It is not in the province of our journal to consider the subject in either its political, municipal, or social aspect. We believe that continual statements of these facts may assist in amendment. This subject has been introduced into our columns, because we intend to treat of roads, architectural improvements, metropolitan railway communication, wharving, etc., in detail, critically and technically; and also to introduce those most important subjects of modern engineering—to wit, drainage, sanitary reform, the utilization of sewage, etc.—these remarks concerning New-York City being considered as an introduction to the subdivisions we intend hereafter analyzing.

The Late John A. Roebling, Civil Engineer.

OUR readers must have heard with surprise and regret, from the announcement in our last issue, of the death of the celebrated engineer, John A. Roebling—with surprise, from the fact that but a few days previously he was in the active prosecution of his labors in connection with his gigantic project, the East River Bridge; with regret, on account of the loss of an engineer who was a brilliant ornament to his profession and to the country which he had chosen for the field of his labors, and which he adorned and enriched with the stupendous results of the workings of his masterly mind. On the 12th of July, he had completed his sixty-third year, and was in the enjoyment of an almost youthful vigor and energy. On the 22d of the month, he had passed away. His death was caused by an accident, which happened a short time previously, while carrying on some surveys for the East River Bridge. His foot was crushed, causing the necessity of immediate amputation of the toes, which operation, although safely performed, culminated in lockjaw. But even while in this painful condition, he continued to communicate instructions in writing in reference to his favorite scheme.

Mr. Roebling was by birth a Prussian. He was a distinguished pupil of the Royal Polytechnic School of Berlin. The subject of his thesis, upon graduating from that institution, was "Suspension-Bridges"—a subject which made his after life famous, his death glorious, and which will give to his memory a fulness and freshness that cannot pass away. After having been engaged for three years, in accordance with a Governmental regulation, upon the public works in Germany, he emigrated to America. Arriving at Pittsburg, he settled upon a small tract of land, and devoted his attention for a while to agricultural pursuits. About the year 1830, the onward movement in the tide of American engineering affairs set in with all its force, and the young agriculturist was taken up by the first incoming wave. The plough and the harrow, the scythe and the sickle must needs give way to the compass and level, the rod and the chain. He was employed for some time on the various canals and other works at that time being carried on in every direction. With great forethought, he commenced the manufacture of wire-rope, doubtless instigated thereto by a recollection of his early love of the subject of suspension-bridges. The year 1844 records his first work of that class—to wit, the construction of a wooden aqueduct across the Alleghany River, which he carried out on the wire-rope suspension principle, with great success. The construction of the suspension-bridge over the Monongahela at Pittsburg, the site of his early agricultural labors, followed. The erection of suspension-bridges in various localities so far enlarged his experience as to induce him to undertake the apparently impossible task of spanning the Niagara, near the falls, with a railway suspension-bridge. This, his greatest achievement, was completed in 1855, and, for boldness in conception, economy in construction, and proportionate strength in all its parts is, perhaps, unsurpassed by any engineering work of modern times.

His designs of the East River Bridge, the plans of which he had thoroughly matured, and which have withstood the test of the severest criticism at the hands of the ablest engineering talent of the country, are left as the last, and perhaps the greatest, monument of his engineering skill in coping with physical obstacles that to other less bold and comprehensive minds would have proved insurmountable. In the crypt of St. Paul's Cathedral is a simple slab that marks the tomb of its great designer, Sir Christopher Wren. Upon the slab are inscribed, in effect, these words: "If you would seek *his* monument, look around you." Thus it is with John A. Roebling; his works are an imperishable monument to his memory.

Caissons.

As an appendix to the article on "iron coffer-dams," which appeared in our last number, we may mention that the sinking of cylinders, as caissons for foundations, is by no means of recent introduction. Our contemporary, the *Scientific American*, in describing the system adopted in laying the foundations of the Copenhagen bridge in Europe, quotes from Ure's Dictionary, which infers the novelty of sinking cylinders. In India, on the Ganges, from time immemorial, cylinders have been sunk through the water and muddy bed, for construction of piers, out-buildings, etc. The cylinders employed are made of *brick!* and are sunk by means of internal excavation, practiced divers being employed, who, like pearl-divers, can remain for a considerable length of time under water. When sunk sufficiently deep they are filled with rubble, cement, and mud, the whole forming columns, or piles of remarkable stability. This practice is an ancient one, and the Hindoo submarine excavators belong to families who have been so engaged for generations of time. The system of sinking a timber "*drum and cone*," is a practice adopted by miners in sinking shafts from time immemorial. The apparatus described in the *Scientific American* of August 7th might more properly be termed a diving-bell than a caisson.

MARKET REVIEW.

The Coal Trade.

NEW-YORK, July 30th, 1869.

DEALERS are generally busy filling orders taken for coal during the strike. It will be remembered we stated several weeks ago that dealers refused to take orders, except at prices current at the time of delivery. Many retailers left orders with our first-class Lehigh dealers on these conditions, and are now receiving their coal. Those who failed to order coal are running about the market for a supply, but find it difficult to get their orders filled. Thus, any person not acquainted with these details of the coal business might suppose there was an unusual inquiry for coal, and a lack of supply; whereas, the demand is caused by half a dozen dealers who neglected to leave orders in advance for their coal, and, having been caught napping, now make a great fluster and noise in their endeavors to get an immediate supply. We hear of instances where fancy prices have been paid to secure lots of coal, but these sales have mostly been effected by middle-men, who know best how to get a fat price for their article from certain parties who allow any little excitement in the market to get the better of their wits. Indeed, we have noted during the past week that the poorest prepared coal has often brought a higher price than the best Lehigh from first hands! Friends, don't get excited! There is plenty of coal coming to market, and soon there will be enough for all. We don't believe in rushing coal to fabulous prices for the sake of having it tumble back as soon as those companies who are idle resume work, which may be at any day. The members of the New-York and Lehigh Coal Exchange, who fix prices at the beginning of each month, have all through this month, and are still, filling orders at prices quoted by us. They, however, have added to their invoices the extra tolls which have been charged by the transportation companies since July 19th, which amounts to 30 cents. We cannot but admire and commend this effort of prominent dealers to keep down the speculative element of the coal trade.

The impetus to the present excited market was given by a circular issued by the Pennsylvania Coal Company, dated July 19th, which stated that the price for their coal in August would be $8.60 for Lump, Steamer, Broken, and Egg; $8.80 for Stove, and $8.20 for Chestnut. This Company, at the present time, are retailing coal from yard at $8.50 delivered, stove or any other size. They must know that their coal is not worth any such figures as those given in the circular, and only wanted to do (as they often have done before) some incomprehensible, mysterious thing to attract public attention, get this notice free, and see if all the fools were dead yet. We don't believe there was one contract returned to the office on the prices named. We have long since ceased to take the management of this Company as any guide or criterion as regards prices, for they rarely come out right, and generally make a bull of whatever they undertake to do. This wise circular, as we have stated, was issued on July 19th. As soon as the men at their mines learned its tenor, they struck for the basis, very properly thinking that if coal was bringing such prices in the New-York market they should share the profits. We understand that part of their men resumed work this morning at an advance of 30 cents, but the report is not confirmed.

The Scranton and Lackawanna Companies are still idle. They hold out in refusing to accede to the terms of the basis. It is generally credited in the market, however, that some terms will be made in a few days.

The Lehigh Valley Railroad Company have issued another circular, bearing date July 27th, in which tolls will be advanced ½ a cent per mile from Penn Haven on all through coal, making a total of $1.15; and on line coal, ½ a cent per mile, making a total of $1.38. This advance is to take effect on August 2d.

The only opportunity that the transportation companies have to pay dividends, it would seem, is when coal is selling at a high figure, and the market is excited. It is claimed that none of them have made money during the past six months, but three separate advances in tolls in thirty days looks as though they intended to "retrieve lost fortunes" now, and to "make hay while the sun shines." We certainly do not believe that coal will rise to any such price as it attained last fall. We believe that the prices at present asked are unwarranted, and, if notice were to reach us to-morrow that the three large companies had gone to work, the bubble would be pricked, and the whole scheme entirely squelched. Even without the usual production of these large companies, we are receiving such quantities of coal per week (some 350,000 tons), from the combined efforts of those that are at work, that people need not get frightened with the idea that there will not be a plentiful supply. In the face of these facts, we cannot advise dealers to buy coal at the prices now asked. Some three weeks ago, we urged retailers to come forward and buy coal, and save money, but they did not heed our advice; they yielded to the advice of the editors of the daily papers, who have got them in the present nice corner.

Our quotations this week are nominal. No actual price-list can be made until the present excitement ceases. Matters will be toned down in a few days, and our new August prices will be forthcoming next week.

Freights remain unchanged. Captains are endeavoring to get an advance of $1.85 to Boston, but find it a difficult operation. Vessels are in fair supply.

Messrs. White, Fowler & Snow, of Trinity Building, have a few cargoes of desirable coals, which they offer at reasonable rates.

We learn from our Philadelphia correspondent, that the steamer *Rattlesnake* arrived at Port Richmond on July 29th; she loads immediately for Salem, Mass. This is the return trip of her second voyage, having made the voyage to Portsmouth, N. H., and back, including the time employed in loading and discharging, in less than nine days. At the time the steamer arrived at Portsmouth, there were eleven schooners ahead of her to be unloaded, and the facilities for unloading at the railroad-wharf were very limited, but with her own hoisting apparatus she unloaded her cargo successfully. The steamer has now been thirty-four days in service, during which time she laid at Chester fourteen days for alterations in her hoisting machinery. She has made two trips inside of twenty days, or ten days to a trip, and transported nearly twelve hundred tons of coal.

The second vessel of the fleet, the *Centipede*, was launched successfully on July 29th, and the machinery and boilers will be put in this week. Practical results have thus far justified the wisdom and forethought of the projector of this line, and in view of the experience gained with the *Rattlesnake*, there will at once be large additions made to the fleet.

The coal market here is quite firm, with an upward tendency. The general feeling is, that prices will be high until late in the fall. On and after August 2d, the tolls will be $2.50 from Schulykill Haven.

The following table exhibits the quantity of Coal passing over the following routes of transportation for the week ending July 24th, 1869:

COMPANIES.	1868. WEEK.	1868. TOTAL.	1869. WEEK.	1869. TOTAL.
Phila. & Read. R. R.	6,122	1,687,602	115,935	1,749,362
Schuylkill Canal,	1,880	479,557	33,053	314,389
Lehigh Valley R. R.	16,244	1,315,291	62,809	1,186,340
Lehigh & Sus. R. R.	3,628	210,064	6,024	238,578
Lehigh Canal,	5,184	391,869	34,487	273,725
Scranton North,	15,508	284,665		205,857
" South,	18,460	603,340		587,631
Penn. Coal Co., rail,	21,091	484,557	18,113	535,061
" " " canal,	590	13,212	836	9,041
Del. & Hudson Rail,			528	99,345
" " " canal,	51,227	721,011	21,853	593,962
Shamokin,	9,595	261,099	10,358	187,704
Trevorton,	574	10,606		9,448
Short Mountain,		53,079	2,753	53,260
Lykens Val. Can. Co.	1,933	45,870		33,103
Hunt'g'n & B'd Top,	5,155	130,180	7,142	195,768
Wyoming South,		102,536		83,955
" North,				
Williamstown, Col'y		91,011	6,894	96,624
Total,	157,191	6,885,549	320,785	6,453,153
1869,		6,453,153	157,191	
Decrease,		432,496	163,694	

Lehigh Canal Coal Trade.

Shipped for the Week Ending July 24, 1869.

WHERE FROM.	WEEK. Tons. Cwt	TOTAL. Tons. Cwt.
Total M. Chunk Region,	11,506 17	79,228 12
" B. Meadow "	6,577 12	41,453 10
" Mahanoy "		1,070 17
" Hazleton "	7,862 11	70,572 07
" Upper Lehigh "	428 02	2,896 02
" Wyoming "	8,112 02	78,503 08
Grand Total,	34,487 04	273,724 16
Corresponding week last year,	5,183 17	391,869 14
Increase,	29,303 07	
Decrease,		118,144 18

Report of Coal Transported over Lehigh Valley Railroad

For the week ending July 24, 1869, and previously this season, compared with the same time last year:

WHERE SHIPPED FROM.	WEEK. Tons. Cwt	PREVIOUSLY Tons. Cwt.	TOTAL. Tons. Cwt.
Total Mahanoy,	15,000 11	182,596 06	197,605 17
" B. Meadow,	12,424 13	203,418 14	215,843 07
" M. Chunk,	26 06	124 04	150 10
" U. Lehigh,	208 09	7,910 13	8,119 02
" Hazelton,	24,148 07	548,343 14	572,492 01
" Wyoming,	11,518 16	217,911 09	229,430 05
Total,	63,336 02	1,160,305 00	1,223,641 02
To L. & S. R. R., at P'n Hav. for rail,		4,174 00	4,174 00
Do. for canal,	7,862 11	66,710 16	74,573 07
At Mauch Chunk for Canal,	6,577 12	37,852 02	44,429 14
Total Anthracite,	77,776 05	1,269,041 18	1,346,818 03
Susquehanna Region Bit. Coal (Fall Creek)		552 03	552 03
Tl. by rail & canal,	77,776 05	1,269,594 01	1,347,370 06
Same time last y'r,	20,055 06	1,395,715 12	1,415,770 18
Increase,	57,720 19		
Decrease,		126,121 11	68,400 12
Forw'd east from M. C'k by rail,	62,809 08	1,123,531 04	1,186,340 12
Same time last y'r,	16,243 13	1,299,047 15	1,315,291 08
Increase,	46,565 15		
Decrease,		175,516 11	128,950 16

RECAPITULATION:

Forw'd east from M. C'k by rail,	62,809 08	1,123,531 04	1,186,340 12
Del. at M. Chunk,	5 04	632 05	637 09
Del. on line of r'd above M. Chunk,	10 10	5,439 14	5,450 04
Del. ab. M. C. for use of L. V. R. R.,	511 00	25,946 18	26,457 18
To N. C. R. R., at Mt. Carmel,		2,516 09	2,516 09
To L. & S. R. R., at P'n Hav., for r'l.		4,174 00	4,174 00
Do. for canal,	7,862 11	66,710 16	74,573 07
Do. Packerton for rail,		2,790 13	2,790 13
At Mauch Chunk for canal,	6,577 12	37,852 02	44,429 14
Total,	77,776 05	1,269,594 01	1,347,370 06

Lehigh and Susquehanna Railroad.

Report of Coal Shipped South for the Week ending July 24, 1869.

WHERE FROM. WYOMING REGION.	WEEK. Tons. Cwt	TOTAL. Tons. Cwt.
Total M. Chunk Region,	5,464 06	78,044 16
" Hazelton "	7,823 06	72,260 10
" Upper Lehigh "	3,130 01	65,712 16
" Wyoming "	22,573 16	358,079 08
Grand Total,	38,991 09	574,097 10
Corresponding week last year,	8,226 19	406,734 11
Increase,	30,764 10	167,362 19
Decrease,		
Forwarded South from Mauch Chunk,	22,225 10	387,963 19
Delivered on line of L. & S. R. R., above Mauch Chunk,	564 16	17,928 19
Delivered to Lack. & Bloom. R. R., at Plymouth Bridge,		13,688 06
Delivered to L. V. R. R. Co., at Sugar Notch,		5,151 03
Delivered at Coal Port, for Shipment by Canal,	16,201 03	149,365 03
Total,	38,991 09	574,097 10

Schuylkill Coal Trade.

By railroad and canal for the week ending Thursday, July 22, 1869.

PLACES.	RAILROAD.	CANAL.
St. Clair,	38,125 02	
Port Carbon,	10,866 03	12,297 12
Pottsville,	5,741 06	2,678 00
Schuylkill Haven,	37,474 13	17,261 00
Auburn,	3,797 16	
Port Clinton,	17,574 12	816 00
Total paying freight,	113,579 12	
Coal for Company's use,	2,355 00	
Total for week,	115,934 12	33,052 12
Previously this year,	1,633,427 10	281,336 05
Total,	1,749,362 02	314,388 17
To same time last year,	1,677,070 06	479,556 19
Increase,	72,291 16	
Decrease,		165,168 02

Prices of Coal by the Cargo.

[CORRECTED WEEKLY.]

	AT NEW-YORK, July 29th. R. A.	W. A.	AT PHILADELPHIA, July 29th. R. A.	W. A.
SCHUYLKILL.				
Lump,	$....	$8 50	8 50	8 00
Steamer,	....	8 75	8 50	8 00
Broken,	....	8 75	8 50	8 00
Egg,	....	8 75	8 50	8 00
Stove,	....	9 00	8 50	8 00
Chestnut,	....	7 50	7 50	7 00
Pea,	....	....	....	....
LEHIGH.				
Lump,	7.50	....	7 50	....
Steamer,	7.25	....	7 25	....
Broken,	7.25	....	7 25	....
Egg,	7.25	....	7 25	....
Stove,	7.50	....	7 50	....
Chestnut,	6.75	....	6 75	....
Pea,	....	....	5 75	....
SPECIAL COALS.*				
Diamond Vein,	R. A.	9 25	....	....
New-England,	"	....	....	....
Locust Dale,	W. A.	9 00	....	....
Honey Brook, Le'h	"	7 50	....	....
Harleigh,	"	7 50	....	....
Spring Mount'n	"	7 50	....	....
Sugar Creek,	"	7 50	....	....
Sugar Loaf,	"	7 50	....	....
Fulton,	"	7 50	....	....
Stout,	"	7 50	....	....
Old Comp'y's	"	....	....	....
Cross Creek,	"	7 50	....	....
Chauncey,	"	....	....	....
Girardville,	"	....	....	....
McMichael,	"	....	....	....
Duncan,	"	....	8 50	9 00
Shamokin,	"	7 00	8 00	....
Lykens Valley,	"	....	8 50	....
Broad Top,	"	....	5 25	....
Hill & Harris,	"	....	8 00	....
Henry Clay,	"	....	8 25	....
Powelton,	"	....	8 00	....
Burnside,	" R. A.	....	9 00	....

[* Dealers in these coals may be found in our advertising columns.]

Kittaning Coal Co.'s Phœnix Vein, f. o. b. $5 50
Lemon " " " 5 25

COMPANY COALS.

	L.	Str.	Gra.	Eg.	Sto.	Cst.
Scranton at E. Port,	...	...	...	...	...	...
Pittston at Newb'g,	8 60	8 60	8 60	8 60	8 80	8 20
Lacka'na at Rond't,	7 25	7 25	7 25	7 25	7 50	6 10
Wilk'b're at Hob'kn,	..	7 25	7 25	7 25	7 50	7 00

For freights to different points, see "Freights."

Prices at Baltimore, July 27th, 1869.

Wholesale Prices to Trade.

Wilkesbarre, by cargo or car load,		$7 25
Pittston and Plymouth,	$7 00	7 25
Shamokin R., or W. Ash	7 25	7 50
Lykens Valley, R. A.	6 75	7 00
Trevorton, R. A.	6 50	6 75
By retail, per ton of 2240 lbs. delivered,	8 50	9 00
Georges Creek & Cumberland f. o. b. at Locust Point for shipping,		5 00
West Fairmount Gas, f. o. b.,		6 50

Prices at Georgetown, D. C., & Alexandria, Va.

July, 1869.

George's Creek & Cumberland f. o. b. for shipping, ... $4 75

Prices at Havre de Grace, Md.

July, 1869.

Wilkesb're & other White Ash for cargoes,		$7 25
Lykens Valley,		7 25
Shamokin R. or W. Ash	7 00	7 50
Trevorton and Zerba Valley,	6 75	7 00

Prices for Coal at Mauch Chunk.

	L.	Str.	Gra.	Eg.	Sto.	Cst.
Lehigh,	$4 00	$4 50	$4 50	$4 50	$4 50	$4 00
Wilkesbarre,	4 00	4 50	4 50	4 50	4 50	4 00

Freight to Elizabethport, $2.28; to New-York, $2.35.

Prices of Foreign Coals.

July, 1869.

Duty, $1.25 per ton.

Corrected weekly by PARMELEE BROS., 32 Pine-street, New-York.

Liverpool Gas Caking,	$ 9 50
" " Canned,	14 00
" House "	18 00 19 00
" " Orrel,	16 00 18 00

Per ton 2240 lbs., Ex. Ship.

PRICES FROM YARD.

Liverpool House Orrel, screened,	$16 00 $18 00
" " Canned, "	18 00 20 00

Per ton 2000 lbs., delivered.

Prices of Gas Coals.

July, 1869.

PROVINCIAL.

Duty, $1.25.

	Coarse. Gold.	Slack. Gold.
Block House,	$1 75 @	75
Gowrie,	1 75	75
Lingan,	1 75	75
Sydney,	2 13½	71½
Pictou,	2 13½	1 18½
Little Glace Bay,	1 50	1 00
Caledonia,	1 50	75

AMERICAN.

	Coarse. Currency.	Slack. Currency.
Westmoreland Co.,	$8 75	
Despard Coal Co.,	8 50	8 00
Penn,		
Newburg Orrel Gas,	8 50	8 00
West Fairmount Gas Coal,		8 00

AT PHILADELPHIA.

Powelton,	7 80

Rates of Transportation to Tide Water.

[BY RAILROAD.]

TO PORT RICHMOND, PHILADELPHIA.

Philadelphia and Reading Railroad, from Schuylkill Haven, ... $2 50

From Port Carbon, 8 cents per ton more.

TO ELIZABETHPORT.

L. V. Railroad from Mauch Chunk to Easton,	$1 04
C. R. R., N. J., Easton to Elizabethport,	1 54
	$2 58
Shipping Expenses at Elizabethport,	25
Total,	$2 83

Freights.

July, 1869.

To Eastern Ports.	From Philadel'a.	From E. Port and Port Johnston.	From Newburg.	From Rondout.
Stamford,	$1 85	$1 00	$1 25	$1 25
Norwalk,	1 85	1 00	1 25	....
Bridgeport,	1 85	1 15	1 25	1 25
New-Haven,	1 85	1 00	1 25	1 25
Hartford,	1 85	1 10	....	1 65
New-London,	1 85	1 15	1 35	1 35
Norwich (and tow),	1 85	1 25	1 45	1 45
Mystic,	1 85	....	1 40	....
Stonington,	1 85	....	1 40	1 35
Sag Harbor,	1 85	....	1 40	....
Bristol,	1 85	....	1 55	1 60
Newport,	1 85	1 40	1 55	1 60
Fall River,	1 85	1 40	1 55	1 60
Providence,	2 25	1 40	1 60	1 60
Dighton,	....	....	1 60	....
Warren,	....	....	1 60	....
Pawtucket,	2 50	....	1 75	1 75
New-Bedford,	2 25	1 40	....	1 75
East Cambridge,	2 80	....	2 00	....
Salem,	2 80	1 75	1 85	1 75
Newburyport,	3 00	2 00	1 95	1 80
Portsmouth,	3 00	1 75	1 90	1 80
Rockport,	....	....	1 90	....
Saco,	3 00	1 75	1 90	1 75
Portland,	3 00	1 75	1 80	....
Bangor,	....	....	1 80	1 80
Bath,	3 00	....	2 00	....
Middletown,	....	....	....	....
Amesbury,	2 70	....	....	....
Boston,	2 80	....	....	....
Cambridgeport,	2 80	....	....	....
New-Bedford,	2 25	....	....	....
Taunton,	2 50	....	....	....
Derby,	2 00	1 25	....	....
New-York,	1 75	55	....	....
Hackensack,	1 75	....	....	....
Jersey City,	1 75	35	....	....
To River Ports.				
Troy,	2 35	95	60	65
Albany,	2 30	90	55	50
Coeyman's,	1 90	....	55	50
Stuyvesant,	1 90	....	50	45
Coxsackie,	2 15	....	45	45
Hudson,	....	1 00	40	50
Catskill,	....	....	40	35
Poughkeepsie,	1 90	75	30	25
Fishkill,	1 95	....	20	30
Cold Spring,	1 90	70	30	50
Haverstraw,	....	50	45	55
Nyack,	1 85	50	55	50
Sing Sing,	1 80	....	60	50
Yonkers,	....	40	60	55
New-York,	....	50	70	
Saugerties,	1 75	....	35	30
Rhinebeck,	1 85	....	30	35
Rondout,	1 85	60	30	25
Tarrytown,	1 90	80	60	....
West Point,	1 90	75	30	50

Metals.

IRON.—Duty: Bars, 1 to 1¼ cents ₩ lb; Railroad, 70 cents ₩ 100 lbs.; Boiler and Plate, 1¼ cents ₩ lb; Sheet, Band, Hoop, and Scroll, 1½ to 1¾ cents ₩ lb; Pig, $9 ₩ ton; Polished Sheet, 3 cents ₩ lb.

Pig, Scotch, No. 1, ₩ ton,	37 50@42 —
Pig, American, No. 1,	42 — — —
Pig, American, No. 2,	38 — 39 —
Pig, American, Forge,	36 — — —
Bar, Refined, English and American,	85 — 90 —
Bar, Swedes, assorted sizes (gold),	82 50 87 50

STORE PRICES.

Bar, Swedes, ord'y sizes,	less 5 ₩ ct., — — 140 —
Bar, Refined,	less 5 ₩ ct., 90 — 92 50
Bar, Common,	less 5 ₩ ct., 85 — 87 50
Scroll,	less 5 ₩ ct., 120 — 150 —
Ovals and Half-round,	less 5 ₩ ct., 117 50 142 50
Band,	less 5 ₩ ct., 117 50 — —
Horse Shoe,	less 5 ₩ ct., 117 50 — —
Rods, ¼ to 3-16 inch,	less 5 ₩ ct., 97 50 155 —
Hoop,	less 5 ₩ ct., 125 — 180 —
Nail Rod, less 5 ₩ ct.,	8¼ — 9¼
Sheet, Russia, as to Nos. (gold),	— 10¾ — 12¼
Sheet, Single, D. and T. Common,	— 5 — 7
Sheet, Galvanized,	List 20 @ 25 ₩ cent dis.
Rails, English (gold), ₩ ton,	— — — 56 50
Rails, American, at Works in Pa.,	— 74 — 76

STEEL.—Duty: Bars and ingots, valued at 7 cents ₩ lb or under, 2½ cents; over 7 cents and not above 11, 3 cents ₩ lb; over 11 cents, 2½ cents ₩ lb, and 10 ₩ cent ad val. (Store prices.)

English Cast (2d and 1st quality) ₩ lb,	— 18 @ — 22
English Spring (2d and 1st quality),	— 9 @ — 11½
English Blister (2d and 1st quality),	— 11½@ — 19
English Machinery,	— 12½@ — 15
English German (2d and 1st quality),	— 14 @ — 16
American Blister, "Black Diamond,"	— 10½@ — 16
American, Cast, Tool, "	— 19 @ — —
American, Spring, "	— 10 @ — 13
American Machinery, "	— — @ — 13
American German, "	— 10 @ — 13

COPPER.—Duty: Pig, Bar, and Ingot, 5; old Copper cents ₩ lb; Manufactured, 45 per cent ad val.

	All Cash.
Copper, New Sheathing, ₩ lb,	— @ — 32
Copper Bolts,	— @ — 33
Copper Braziers, 16oz. and over,	33 @ — 35
Copper Nails,	38 @ — 40
Copper, Old Sheathing, etc., clean,	22½@ — 23½
Copper, Chili Pig,	— @ — —
Copper, American Ingot,	22 @ — 22½
Yellow Metal, New Sheathing,	— @ — 27
Yellow Metal Bolts,	— @ — 27
Yellow Metal Nails,	— @ — 27

LEAD.—Duty: Pig, $2 ₩ 100 lbs.; old Lead, 1½ cts. ₩ lb; Pipe and Sheet, 2½ cents ₩ lb.

Galena, ₩ 100 lbs,	— — @ — —
Spanish (gold),	$6 25 @ $6 35
German "	6 25 @ 6 50
English "	6 25 @ 6 87½
Bar, (less 6 ₩ cent)	— — @ 10 50
Pipe and Sheet, "	— — @ — 12

TIN.—Duty: Pig, Bars, and Block, 15 ₩ cent. ad val.; Plate and Sheets and Terne Plates, 25 ₩ cent. ad val.

	Gold, ₩ lb.
Banca,	33½@ — —
Straits,	29 @ — 29½
English,	29½@ — 30

Plates.

	Gold.	Currency.
Fair to good brands,	$8 — @ $8 50	$11 25 @ $12 —
I. C. Charcoal, ₩ box,	6 75 @ 7 50	9 50 @ 10 75
I. C. Coke,	5 75 @ 6 —	8 25 @ 8 50
Coke Terne,	7 75 @ 8 25	10 87½@ 11 75
Charcoal Terne,		

SPELTER.—Duty: In Pigs, Bars, and Plates, $1.50 ₩ 100 lb.

	Gold.
Plates, Foreign, ₩ 100 lb.	$6 37½@ $6 40
Plates, Domestic, ₩ lb.	11 @ 12

REMARKS.

IRON.—There is only a moderate inquiry for Scotch Pig, but as there is no disposition to press sales, prices are steady; an invoice of 350 tons Eglinton per steamer sold previous to arrival on private terms. American is still offered sparingly, and full prices are obtained. We notice sales of 200 tons No. 1 Wrought Scrap at $42.50, and 100 do. White, on private terms.

There is less inquiry for new English Rails, but with a light stock and small arrivals, previous quotations are fully supported; 1000 tons old, to arrive, sold on terms we did not learn. Bar from store continues, as for a long time past, without animation, and nominal at our quotations. There are no invoices offering from importers' hands, the jobbers importing nearly all their own stock, so far as foreign is concerned; the imports, however, are light, the domestic article chiefly supplying the demand; and there are those who affirm that there is too much made in this country for the demand.

STEEL is steady at our quotations.

COPPER has been very dull, and the sales for the week do not exceed 350,000 lbs. Lake Superior has been sold at 21½c. and Baltimore, which is in small supply, at 22c. The latter is the quotation for both kinds.

The English market is dull at £68 @ £68 10s. for Chili Bars.

TIN is quiet, but firmly held. Sales, 300 slabs; Straits at 29½c. gold; Banca is quoted at 33½c.; English, 29½c. @ 30c. gold.

The London market is unchanged at £129 6s. @ £130 for Straits; Banca in Amsterdam 78fl.

SPELTER is dull at $6.37½ gold for Silesian, without wholesale transactions.

LEAD is very quiet, nothing doing at wholesale. Ordinary foreign is quoted at $6.25 @ $6.37½ gold.

ZINC.—We quote best French Oxide Zinc, 12½c. @ 13c.; best American Oxide Zinc, 8½c. @ 9c.; Metallic Zinc, 12½c. Duty, 2½c. per lb.

BLACK OXIDE MANGANESE, Pembroke brand, lumps, 4½c.; Pembroke brand, powdered, 5c.

Mining Stocks.

NEW-YORK, July 29 h, 1869.

A GLANCE through the gold and silver list reveals a marked advance in prices. Compared with last week's report, Consolidated Gregory shows an advance of 45c., Quartz Hill from 10c. to 20c., and Smith & Parmelee from 35c. to 45c. Copper stocks continue at about the same figures as heretofore given; 30c. is asked for Davidson. Lead stocks are also quoted at advanced prices; $3.75 is now asked for Tudor. Some of the leading Petroleum shares are quoted at higher figures.

	Bid.	Asked.
Benton Gold	$ 15	25
Consolidated Gregory	1 80	1 85
Grass Valley	37	45
Gunnell Gold	—	50
La Crosse Gold	13	18
Mariposa	8	9
" pfd	15½	16
Montana Gold	—	15
Quartz Hill	1 10	1 20
Smith & Parmelee Gold	2 40	2 50
N. Y. and Eldorado	20	1 00
Combination Silver	2 00	4 50
Quicksilver	15½	16½
Davidson Copper	—	30
Flint Steel River	—	4 00
Wallkill Lead	7	15
Wallkill, assented	15	20
Tudor Lead	3 65	3 75
Cumberland Coal	32½	—
Lehigh and Susquehanna Coal	78	—
Brevoort Petroleum	1 50	—
Buchanan Farm	50	60
Central	60	64
Home Petroleum	5 00	6 50
National	—	2 50
N. Y. & Alleghany	75	1 50
Northern Light	45	—
Pithole Creek	1 75	2 00
Rynd Farm	20	—
United Petroleum Farms	15	20
Rathbone Oil	—	45
Blood Farm	—	2 00
Bliven Oil	40	—

SAN FRANCISCO, CAL., July 26th, 1869.

Stocks.	Bid per ft.	Share
Gould & Curry	103	108
Savage (per share)	82	88
Chollar Potosi	24	
Ophir	21½	
Hale & Norcross	110	115
Crown Point	40	39
Yellow Jacket	53	54½
Belcher	21	
Imperial (per share)	58	
Alpha (per share)	23	22
Kentuck	170	185
Amador	285	

ASSESSMENT.

Yellow Jacket Mining Company, $10, coin, per share. Delinquent, August 18th. Sale, September 17th.

MISCELLANEOUS.

PATENTS.

WILLIAM F. McNAMARA,

Counsellor at Law and Solicitor of Patents.

37 Park Row, New-York.

PATENTS PROCURED

on all improvements in Machinery, Chemical Processes, Compositions, etc. Mining inventions will receive very careful attention. Advice as to the manner of proceeding given free by writing for it. Assignments, Licenses, and Agreements relating to Patents drawn with care. An experience of five years has enabled me to become very familiar with all the requirements of the Patent law, and the working of the Patent Office.

Refer to MESSRS. WESTERN & CO.

March 27-tf.

The Earth-Closet Company

OFFICE:

209 State Street, Hartford, Conn.

SALESROOMS:

597 Broadway, New-York.
513 Market Street, Philadelphia.
19 Doane Street, Boston.

Send for Circulars containing full information and for working drawings, to the Hartford Office.

ALSO FOR SALE

PREPARED DRY EARTH FOR DRESSING WOUNDS AND SORES.

July 20

COAL SHIPPERS.

POWELTON COAL AND IRON CO.,

SOLE MINERS AND SHIPPERS

Of the celebrated

POWELTON

Semi-Bituminous Gas and Anthracite Coals,

104 WALNUT STREET, PHILADELPHIA.

BRANCH OFFICES:

New-York, Trinity Building; 17 Doane-street, Boston; Cleveland, O; Pittsburgh, Pa. Jan. 30-6m-is.

SAMUEL BONNELL, JR.,

Offers for Sale his

SUGAR CREEK

AND

HONEY BROOK

LEHIGH COALS,

OFFICE—43 AND 45 "TRINITY BUILDING," 111 BROADWAY, N. Y.

E. B. ELY & CO.,

SHIPPERS OF

COAL,

33 Trinity Building, 111 Broadway, NEW-YORK.

"Old Company's" Lehigh, J. H. Swoyer's Enterprise, Wyoming, Wilkesbarre, and Locust Mountain Bituminous Coal.

E. B. ELY. S. W. ELY.

Apr. 24-1y-q

HONEY BROOK COAL COMPANY,

Exclusive Miners and Shippers of the Celebrated

HONEY BROOK LEHIGH COAL,

No. 111 BROADWAY, NEW-YORK.

JAS. H. LYLES, Agent.

Wharves, Port Johnson, N. J. Philadelphia Office, 209 Walnut-street.

Apr. 20 1y **J. B. McCREARY, President.**

WILKESBARRE COAL,

Delivered Direct from the Mines of

The Wilkesbarre Coal and Iron Co.,

OR FOR RESHIPMENT AT

HOBOKEN AND JERSEY CITY.

Office, No. 80 Broadway,

April 1-1y NEW-YORK.

WHITE, FOWLER & SNOW,

Successors to JOHN WHITE & CO.,

Wilkesbarre and Lehigh Coal,

FOR STEAM AND FAMILY USE.

OFFICE,

ROOM NO. 75, 111 BROADWAY (Trinity Building).

JNO. WHITE. LINDLEY H. FOWLER. LOUIS T. SNOW.

Jan. 1-1y

DAY, HUDDELL & CO.,

MINERS AND SHIPPERS OF

HARLEIGH LEHIGH COAL,

And the Celebrated

HICKORY, BROAD MOUNTAIN, EXCELSIOR, SHAMOKIN AND NEW-ENGLAND RED ASH.

OFFICES,

ROOM 51, TRINITY BUILDING, 111 Broadway.

Philadelphia, 109 WALNUT STREET. **Boston,** 7 DOANE STREET.

ap. 20-1y

RANDOLPH BROTHERS,

SOLE AGENTS OF THE ORIGINAL

SPRING MOUNTAIN LEHIGH COAL,

Extensively Used for Smelting Iron

ROOMS, 28 AND 30, TRINITY BUILDING, **NEW-YORK.**

Apl. 6-tf

COXE BRO.'S & CO.,

Cross Creek Colliery,

Miners and Shippers of the Celebrated

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FROM THE BUCK MOUNTAIN VEIN.

OFFICES:

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Agent in New-York, SAMUEL BONNELL, JR., Room 43, Trinity Building,

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KITTANING COAL COMPANY,

SOLE MINERS AND SHIPPERS OF

BITUMINOUS COAL,

FROM THE COLLIERIES:

Tunnel Hill (LEMON VEIN), Gallitzin Cambria Co.
Beaverton (PHŒNIX VEIN), Osceola Mills, Clearfield Co.

Unequalled for Steam, Rolling Mills, Forges, Glass Works, Brick Kilns, Lime Kilns, and Coke, for the Manufacture of Steel, etc.

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July 6-6mo

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C. J. & J. H. EASTWICK & CO.,

SHIPPERS OF

WHITE AND RED ASH COAL.

No. 228 DOCK STREET, PHILADELPHIA, and No. 19 DOANE STREET, BOSTON.

BURNSIDE RED ASH, SHAMOKIN WHITE ASH, LOCUST MOUNTAIN WHITE ASH COAL.

Jan.1y-is s.a.

THE DESPARD COAL COMPANY

OFFER THEIR SUPERIOR

DESPARD COAL

To Gas Light Companies throughout the country.

MINES IN HARRISON COUNTY, West Virginia.
WHARVES, LOCUST POINT, COMPANY'S OFFICE, No. 29 South St., } Baltimore.

AGENTS:

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BANGS & HORTON, No. 31 Doane Street, Boston.

Among the consumers of Despard Coal we name: Manhattan Gas Light Co., New-York; Metropolitan Gas Light Co., New-York; Jersey City Gas Light Co., Jersey City, N. J.; Washington Gas Light Co., Washington, D. C.; Portland Gas Light Co., Portland, Me.

☞ Reference to them is requested. May 30-1y

LEWIS AUDENRIED & CO.,

Miners and Shippers of the following celebrated

ANTHRACITE COALS.

From Philadelphia and the Mines.

DIAMOND, Red Ash; SPOHN, Red Ash; ORCHARD, Pink Ash; BROAD MOUNTAIN, White Ash; LOCUST MOUNTAIN, White Ash; BLACK HEATH, White Ash OLD COMPANY'S LEHIGH; WILKESBARRE.

From Port Johnston and Jersey City,

OLD CO.'S LEHIGH, HAZLETON, WILKESBARRE, AND SHENANDOAH COALS.

Also the superior CUMBERLAND COALS,

BROAD TOP,	BARTON,	BARTON,
SEMI-BITUMINOUS, at Philadelphia.	GEORGES CREEK, at Baltimore.	GEORGES CREEK, at Alexandria.

205 Walnut Street, PHILADELPHIA; 14 Kilby Street, BOSTON; 34 Westminster Street, PROVIDENCE; 24 Second Street, BALTIMORE.

110 BROADWAY, NEW-YORK.

July 13-1y

English Coal and Cannel.

DESPARD COAL, from Baltimore,

PROVINCIAL COAL,

ANTHRACITE COAL.

For sale in lots to suit.

PARMELE BROS.,

Agency of OSCAR I. VAN WART, Liverpool.

OFFICE, No. 32 PINE STREET, NEW-YORK.

Yard, West 22d Street, near 10th Avenue.

Feb.27-1y

W. D. CRANE & CO.,

SHIPPERS OF

Anthracite and Bituminous

COAL,

For Iron and Steam Purposes.

NEW-YORK:	BOSTON:
115 Broadway.	26 Kilby Street.

Apr.10-tf

VAN WICKLE & STOUT,

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FULTON & STOUT

LEHIGH COALS.

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Our Fulton Lump is a Superior Article for FOUNDRY USE. Feb.20-1y

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COAL.

Office, 47 Trinity Building, 111 Broadway, New-York.

E. L. MORRIS. J. A. BRAMAN.

Apr.24-tf-q

G. B. LINDERMAN & CO.,

MINERS,

Sugar Loaf, Lehigh Coal.

OFFICE:

50 TRINITY BUILDING,

May 23-1y 111 BROADWAY, N. Y.

TYLER & CO.,

SOLE AGENTS FOR THE SALE OF

J. J. Conner's "Girardville" and "McMichael" Locust Mountain and "Duncan" Red Ash Coals.

Also, dealers in the best varieties of Lehigh, Shamokin and Wilkesbarre

COALS.

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19 DOANE STREET, Boston.
228 WALNUT STREET, Philadelphia.
HATCH & TYLER, Hartford, Conn.

May 1-1y **Box 1371, P. O., N. Y.**

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P. H. VAN DER WEYDE, M.D.,

Professor of Chemistry and Metallurgy,

N. Y. DENTAL COLLEGE,

(Late Professor of the N. Y. Medical College, of Mechanics, etc., at the Cooper Institute, and of Industrial Science at the Girard College, Philadelphia.)

Analytical and Consulting Chemist and Engineer.

RESIDENCE—73 Seventh Street.
LABORATORY—Twenty-third Street, cor. of Sixth Avenue.
OFFICE—37 Park Row, New-York City.

Jan. 30-tf-

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OF THE

ATLANTIC QUARTZ CO.,

3045 and 3047 Chestnut St., Philadelphia,

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CHARLES P. WILLIAMS,

Late Professor of Analytical and Applied Chemistry, Polytechnic College of the State of Pennsylvania, for the Analysis, Assay and Valuation of Ores, Minerals, Fertilizers and Commercial Products, and for instruction in Analytical, Experimental and Technical Chemistry.

☞ Special attention given to Fertilizers.

Feb. 20-1y-is

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From the Imperial School of Mines, Paris, Member o the Geological Society of France, etc.

OFFICE, WILKESBARRE, PA.

Having had a large practical experience in Europe and this country, is prepared to examine and report on all kinds of Mineral property, superintend Mines and Metallurgical Works, Assay Ores, etc. 18-2-qp

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And Blast Furnaces,

(ASSISTANT ON GEOLOGICAL SURVEY OF MICHIGAN,)

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☞ Written communications preferred. Nov. 28-tf.

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PROFESSOR OF MINING AND METALLURGY,

Rensselaer Polytechnic Institute, Troy, N. Y.,

is open to engagement for the summer months for the examination of Mining Property, or for any work bearing upon Mining or Metallurgy. June 12-tf

INSTRUCTION.

School of Mines, Columbia College.

FACULTY.—F. A. P. BARNARD, S.T.D., LL.D., PRESIDENT; T. EGLESTON, JR., E. M., Mineralogy and Metallurgy; F. L. VINTON, E. M., Mining Engineering; C. F. CHANDLER, PH. D., Analytical and Applied Chemistry; JOHN TORREY, M.D., LL.D., Botany; C. A. JOY, PH. D., General Chemistry; W. G. PECK, LL.D., Mechanics; J. H. VAN AMRINGE, A.M., Mathematics; O. N. ROOD, A.M., Physics; J. S. NEWBERRY, M.D., LL.D., Geology and Paleontology. Regular courses for Mining Engineering; Metallurgy; Geology and Natural History; Analytical and Applied Chemistry. Special students received for any of the branches taught. Particular attention paid to assaying. For further information and catalogues, apply to

DR. C. F. CHANDLER, Dean of the Faculty.

Nov. 21-1y-is

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TROY, N. Y.

A School of Engineering and Practical Science.

FOUNDED 1824.

The courses of instruction, each extending over four years, are

1. Civil Engineering. 2. Mining Engineering. 3. Mechanical Engineering. 4. Natural Science.

Degrees conferred in the different departments.

Applicants for admission must not be less than 16 years of age.

The course in Geodesy includes extensive engineering field practice. The proximity of iron, steel, and machine works, together with railroads, canals, and bridges, affords great facility for thorough practical instruction. Laboratory privileges unsurpassed. Special courses in assaying.

For Annual Register giving full particulars apply to

July 6-1y **Prof. CHARLES DROWNE, Director.**

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Wood-Engraving Establishment.

Engraving, Designing, and Photographing on Wood, in all its branches, viz: Portraits, Fine Book Work, Machinery, Maps, Buildings, Illustrated Catalogues, Views, etc. N.B. Special attention given to Color Work of all descriptions. **48 BEEKMAN STREET, New-York.**

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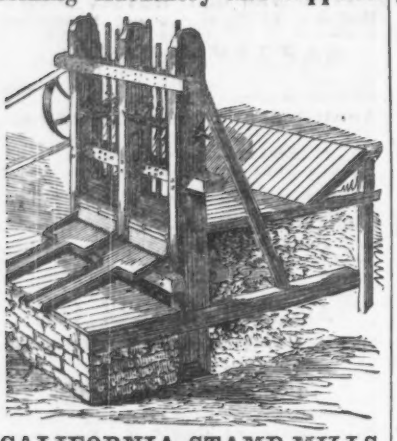
Mining Machinery and Supplies.



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PATENT

Excelsior Grinder and Amalgamator.

Conoidal Separator and Tabular Concentrator,

With Self-Discharging Quicksilver Apparatus.

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Rock Breakers, Retorts, Engines, Boilers, and Shafting, Shoes and Dies of the best White Iron and Steel.

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F. MOREY. J. A. SPERRY. P. M. RANDALL.

Oct.10-1y-is

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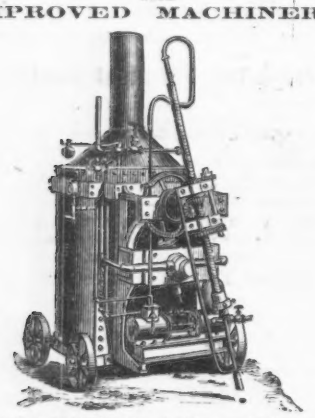
FOR

MINING, QUARRYING, SHAFTING, TUNNELING, WELL-BORING, PROSPECTING, AND SUBMARINE BLASTING,

WITH

IMPROVED MACHINERY,



Adapted to all kinds of rock-drilling. Ordinary rock bored at the rate of

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Mines and Quarries tested in the most satisfactory manner by taking out TEST CORES from any depth. For full information and price list, adddress

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PROPRIETORS AND MANUFACTURERS,

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AND

Nos. 14 and 16 Wall Street.

Mar. 27-3m-is NEW-YORK.

DIAMOND-CARBON,

Shaped and Crystallized for Pointing or Edging Tools used in Mining, Drilling, and working Stone, etc. Send stamps for Circular. JOHN DICKINSON,

May 29-4t 64 Nassau Street, N. Y.

KROM'S DRY ORE CONCENTRATOR.

Concentration by means of Air

has long been attempted, but hitherto without satisfactory results. **S. R. KROM** has invented and patented machines which concentrate the various ores more perfectly than can be done by any other means.

The **Mechanical Combinations** are extremely simple, the machines therefore correspondingly durable. A continuous self-delivery of ore on one side and tailings on the other is effected, hence very little attention is required except keeping the hopper supplied with ore. The power of one man is sufficient to operate a machine that will concentrate one ton per hour.

Parties Interested in Mining are invited to call at No. 210 Eldridge Street, New-York, where they may see a machine in operation, and have samples of their own ores crushed and concentrated.

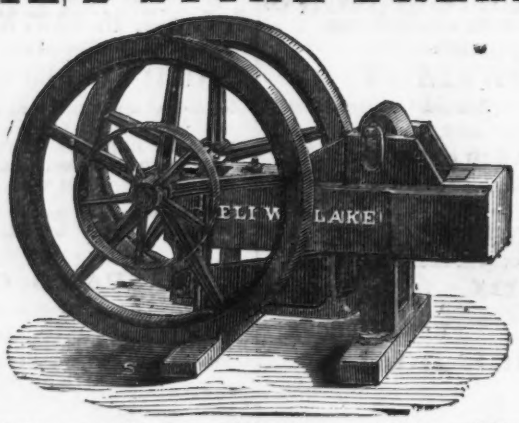
Illustrated Circulars may be had on application to

STEPHEN R. KROM,

Jan.10-1y-is No. 210 Eldridge Street, N. Y.

MINING MACHINERY.

BLAKE'S STONE BREAKER.



The office of this Machine is to break Ores and Minerals of every kind into small fragments, preparatory to their further comminution by other machinery.

This machine has now been in use, enduring the severest tests, for the last ten years, during which time it has been introduced into almost every country on the globe, and is everywhere received with great and increasing favor as a labor-saving machine of the first order.

Illustrated circulars, fully describing the machine, with ample testimonials to its efficiency and utility, will be furnished on application, by letter, to the undersigned.

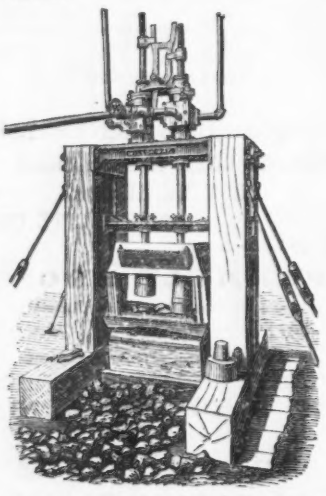
☞ The Patents obtained for this machine in the United States and in England having been fully sustained by the courts, after well-contested suits in both countries, all persons are hereby cautioned not to violate them; and they are informed that every machine now in use or offered for sale, not made by us, in which the ores are crushed between upright convergent faces or jaws actuated by a revolving shaft and fly wheel, are made and used in violation of our patent.

March 14-1y 351 **BLAKE BROTHERS, New-Haven, Conn.**

THE WILSON PATENT STEAM STAMP-MILL COMPANY,

OF PHILADELPHIA, PA.

Are now prepared to supply Miners and other parties with their



NEW STEAM STAMP-MILLS

AT THE SHORTEST NOTICE.

These Mills have now been in operation for upward of a year, and have proved to be the most durable and efficient, as well as the lightest for transportation, of any Mills now used. The valve gear is of the simplest and most durable construction, readily adjustable by movable cams on the piston rods or stamp stems, thereby giving the operator absolute control of the length and velocity of motion and force of the blow. These Mills are adapted for both dry and wet crushing, and for the hardest rock or softest cement. These Mills are every way equivalent to a Twenty Stamp Mill. For full particulars, call on or address

THE WILSON PATENT STEAM STAMP-MILL COMPANY,

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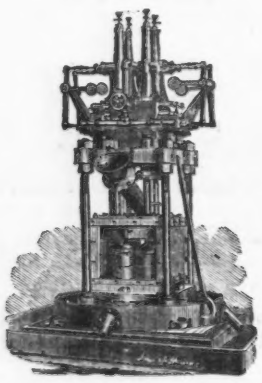
May 7-1y

New-York Steam-Engine Company,

Manufacturers of



STEAM STAMPING MILLS,

Stationary and Portable Engines,

Engine Lathes, Planers, Bolt Cutters, Upright Drills and Machinists' Tools of all descriptions.

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GREAT WESTERN Mining and Manufacturing Company.

CHAS. HENDRIE, President.

MANUFACTURES OF MINING MACHINERY,

AND WHOLESALE DEALERS IN

Mining Supplies.

Our list of patterns includes all the improved processes for the procuring and saving of Gold and Silver from the ores, and it is the intention of the company to procure the right to manufacture all new improved mining machinery as fast as brought before the public. Our list, in part, is composed of the following machinery: Quartz Mills, stamps of any weight desired. Engines and machinery for same, of any size or description known to the trade. Amalgamators, Crushers, Desulphurizers, Engines, portable, hoisting, and pumping, of the most approved construction. Saw Mills, portable or stationary. Shingle Machines, H. H. Low's Patent. We also furnish in lengths to suit, Steam and Conducting Pipes, Steam Gauges, Brass Fixtures, Bolts, Belting, and, in fact, every thing needed by Mining Companies. Our works are located at the following places: BURLINGTON, Iowa; COUNCIL BLUFFS, Iowa; CENTRAL CITY, Colorado, and HELENA, Montana. The advantage of ordering machinery of us will be plainly seen from the fact of our having branches of our works in the mining regions, thereby enabling the companies to procure their repairs there, without having to send back to the States for same, which they would be compelled to do did they procure their machinery at an Eastern shop. Our prices here are the same as the Eastern prices, thereby saving to the companies the extra expense of freight to the West. We will contract to deliver freight at any point on the Missouri River, and will be prepared to send a competent man to superintend the erection of the machinery at the mill if desired. Plans and specifications of the mills furnished to all ordering machinery of us. We would be pleased to receive an order from you for any thing in our line, and feel confident we can fill it to the satisfaction of your company. All orders for machinery should be addressed to WM. C. HENDRIE, Secretary, Burlington, Iowa. Address for information to C. F. HENDRIE, Council Bluffs, Iowa. CHAS. HENDRIE, Helena, Montana. May 29-6m

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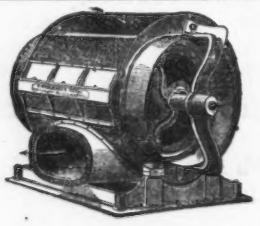

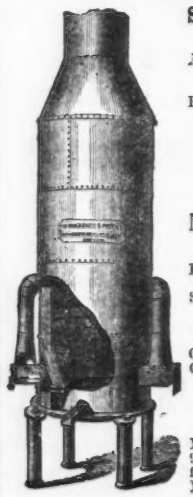

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BLOWER and CUPOLA and SMELTING FURNACE.

Also, Mackenzie's Patent GAS EXHAUSTER and COMPENSATOR. Address

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MANUFACTURING COMPANY, 95 Liberty Street, N. Y. Send for illustrated pamphlet.

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About 1500 pounds very superior ENGLISH GUN COTTON,

IN WATER-PROOF COVERING,

(surplus stock) may be had at less than cost of importation. Address

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Agent of Commonwealth of Massachusetts,

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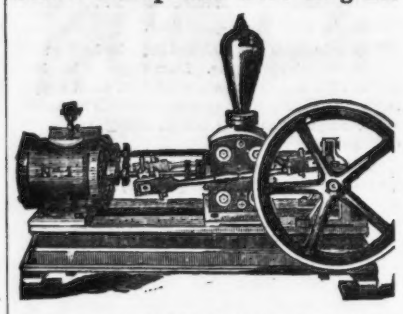
THE WOODWARD Steam Pump Manufacturing Co.

Manufacturers of the

Woodward Patent Improved Safety

Steam Pump and Fire Engine.



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Also dealers in WROUGHT IRON PIPE, BOILER TUBES, etc. Hotels, Churches, Factories, and Public Buildings, heated by Steam, Low Pressure.

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Mar.14-1y GEORGE M. WOODWARD, President.

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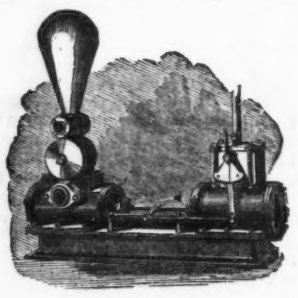

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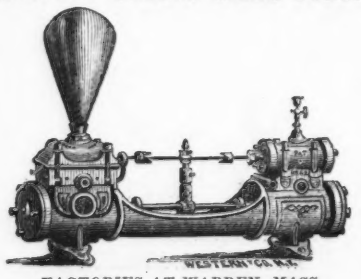

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Air Pumps, Blowing Engines, Hydraulic Pressure Pumps, New Locomotive Pumps, Fire Pumps, Boiler, Feed, Marine, Drainage, Sugar-work, Brewery, Distillery, Oil and Wrecking Pumps.

Improved Horizontal and Vertical

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(Working with Plungers, and especially arranged for pumping water containing dirty or gritty matter).

Pumps for every possible duty, and all fully guaranteed. Also,

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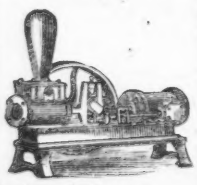

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These Pumps are the cheapest first-class pumps in the market.

All sizes made to order at short notice.

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Compresses Air or Gas to any Required Pressure,

Fryer's Improved Water Pump,

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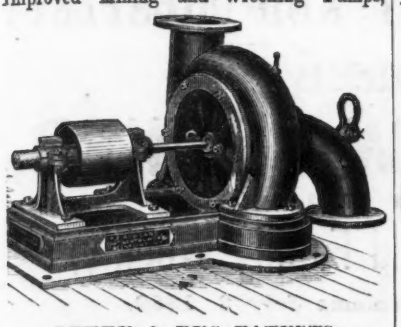
STEAM PUMPS.

Improved Mining and Wrecking Pumps,



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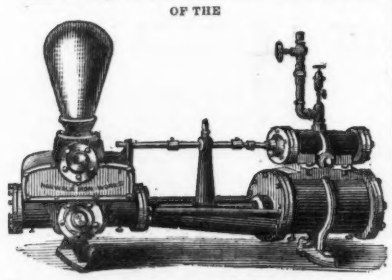
SOUTH NORWALK, CONN.,

Sole Proprietors and Manufacturers

OF THE



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(Patented in the United States, France, England and Belgium.)

Air and Vacuum Pumps,

STEAM AND BLOWING ENGINES,

Pumping-Engines for Water Works, Horizontal and Tumbling Beam Engines, Mining, Wrecking, and Supply Pumps.

IRON AND BRASS CASTINGS, of every Description.

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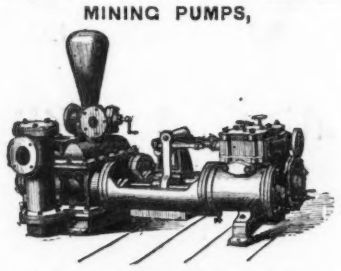
Steam Pumping Engines, Single and Duplex, Worthington's Patent, for all purposes, such as Water Works Engines, Condensing or Non-condensing; Air and Circulating Pumps, for Marine Engines; Blowing Engines; Vacuum Pumps, Stationary and Portable Steam Fire Engines; Boiler Feed Pumps, Wrecking Pumps,

MINING PUMPS,



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FENNER & DUNNE,

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REFERENCES:

FENNER & PRESTON, 66 Pearl St., N. Y. R. W. RAYMOND, Esq., New-York.

April 17-6m

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SHEET BRASS, GERMAN SILVER,

PLATED METAL,

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Gilt, Lasting, Brocade and Fancy Dress Buttons, Kerosene Oil Burners, and Lamp Trimmings.

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PHOTOGRAPHIC GOODS.

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Manufactory, Waterbury, Conn. Sept. 21-1y

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GENERAL MINING AGENT,

TREASURE CITY

WHITE PINE COUNTY,

Nevada.

Reports and full information given regarding the Mines of this wonderfully rich Region. May 1-3m

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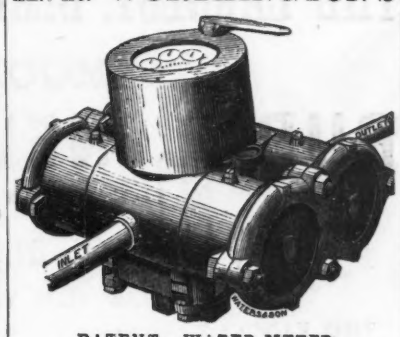
H. R. WORTHINGTON'S



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This Meter is also Used for the Measurement of Oil.

IT COMBINES

ACCURACY, SIMPLICITY, AND REMARKABLE DURABILITY,

with such ease and certainty of motion as to offer no appreciable obstructions to the flow of water in the pipes to which it is connected, as it runs and registers upon three inches head, or when delivering the smallest stream. These qualities, with its low cost, have caused its extensive adoption by corporations and individuals, in many of our larger cities.

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Dec. 12-1y

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Jul. 18-1y

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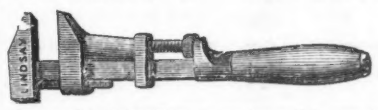

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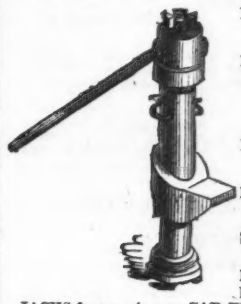

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STEAM HAMMERS.

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OSCILLATING ENGINES, run at great speed. Sizes 1-2 to 250 Horse-Power.

SMOKE-BURNING AND SUPER-HEATING BOILERS are economical and Safe.

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HOISTING MACHINES, run without noise; speed changed or reversed instantaneously.

ALL COMPACT, LIGHT, AND DURABLE.

Address Manufacturers,

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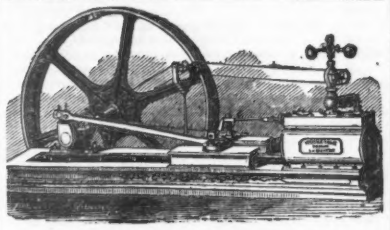

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ROPE MACHINERY, MILL GEARING, SHAFTING.

Lathes, Planers, Drills, Chucks, etc. Iron and Brass Castings. Judson's & Snow's Patent Governors constantly on hand.

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JOSEPH C. TODD. Oct. 27-6m PHILIP RAFFERTY.

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Beware of imitations. H. N. WINANS,

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PATENT FINE CORRUGATED

Iron Shutters and Doors,

MANUFACTURED EXCLUSIVELY BY THE

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We particularly invite the attention of owners of buildings and Insurance companies to an examination of these Shutters and Doors, which are unequalled as protectors against fire.

Practical tests have demonstrated their superior ability to resist heat, over the flat iron shutters and doors of the best and costliest kind.

As is well known, flat iron shutters will warp from heat of fire, and often of the sun.

Our Shutters *will not warp* under any circumstances. They are stiff, strong, light, and ornamental, being made to fit with exactness any opening, and particularly easy to handle, they can be used in many places where heavy shutters are impracticable.

Among our specialties in doors are

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We deliver and hang all our Doors and Shutters at any point.

Their cost is less than that of any other fire iron door or shutter.

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Our Iron Covering is acknowledged as being the best for any building, having all the dryness of wood and the durability and warmth of brick.

It meets the requirements of any city fire law, and its cost is much less than that of brick.

Plans and specifications, with estimates, furnished upon application.

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Sixteen years of use has demonstrated that our

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Is superior to any Roofing now in use. It is put on without any nails or any solder in the roof itself, and full allowance made for expansion and contraction. Every variety of building has been covered with it in the last few years, with most satisfactory results. We are prepared to furnish and lay the Roofing, in any quantities to suit, at short notice. July 20-tf

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ARCHITECTURAL IRON-WORK

OF ALL KINDS.

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Root's Wrought Iron Sectional

SAFETY BOILER.

Over 100 sold—tested to 300 lbs., no large sheet-iron shell to explode. Economical and durable. All sizes on hand. Also, Steam Engines, Steam Pumps, etc. Send for pamphlets and price lists.

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MANUFACTURERS OF

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May 15-tf

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Illustrated in the AMERICAN JOURNAL OF MINING of January 16th, 1869.

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CIRCULAR SAWS

WITH

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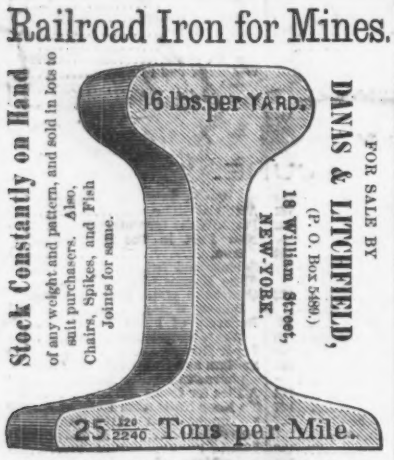

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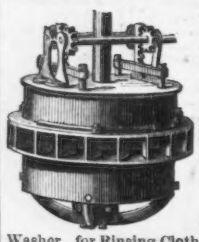

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